



Full length article

Economics education and financial literacy acquisition: Evidence from a field experiment

Lorenzo Corsini ^{a,*}, Gianna Claudia Giannelli ^{b,1}^a University of Pisa, Italy^b University of Firenze, Italy

ARTICLE INFO

Article history:

Received 29 June 2020

Received in revised form 9 August 2021

Accepted 10 August 2021

Available online 16 August 2021

JEL classification:

A23

C93

G53

I23

Keywords:

Financial literacy

Treatment

College education

ABSTRACT

We investigate how attending an undergraduate course in economics affects students' financial literacy. The specific conditions of the course, which was compulsorily taken by law students at the University of Firenze, reproduce a quasi-experiment that enables us to isolate the effect of the course and provides solid evidence on its effect. We find that attending the course has positive effects on financial literacy and that the gain is most relevant for students coming from backgrounds associated with lower financial literacy. The gain is large for topics closer to what was taught in the course but small for other economic issues. From a policy perspective, our evidence provides support for the feasibility and efficacy of policies promoting general economics education, and it also stresses the redistributive and egalitarian character of such policies.

© 2021 Elsevier B.V. All rights reserved.

1. Introduction

There is a growing interest in the evaluation of people's capabilities to understand financial concepts and to manage savings and investments safely, which is usually referred to as "financial literacy". This interest is grounded in the importance of savings and planning to fulfill a lifetime of economic well-being and based on the established fact that individuals are currently facing increasingly complex financial products and services. In a complex economic, financial and working environment, informed savings are key to reaching well-being. It is thus crucial to understand how financial literacy is acquired and, furthermore, how and if it can be taught. As a matter of fact, many governments actively encourage citizens to save more and more appropriately, and in certain cases, they also inform people of the importance of savings and of the relevance of having a proper financial education.

Several studies have investigated the degree and determinants of financial literacy from both empirical (for a review, see [Lusardi and Mitchell, 2011](#)) and theoretical points of view (see [Lusardi et al., 2011](#); [Jappelli and Padula, 2011](#) and [Spataro and Corsini](#)

(2017)). Empirical studies place great emphasis on the relationship between financial literacy and education (see [Almenberg and S ave-S oderbergh, 2011](#) and [Lusardi and Mitchell, 2011](#)). In general, they find that these two aspects are largely correlated, although different types of education have different effects on literacy.

Apart from the overall relationship between general education and financial literacy, the literature has tried to ascertain how it is possible to improve the financial literacy of individuals and whether this is possible through the teaching of economics, financial courses and seminars; although the overall finding highlights great heterogeneity in the effectiveness of financial education programs (see [Walstad et al., 2017](#)), the influence of these programs is generally positive ([Kaiser et al., 2020](#)).

Our paper takes the beginning of these considerations and explores, through a direct case, the extent to which financial literacy can be acquired from a generic economic education. In particular, we want to focus on the effect of attending a single general economics course at the undergraduate level on the acquisition of financial literacy. In this study, we provide evidence for the possibility of delivering financial literacy and provide a policy indication: if teaching (and attending) a general economic course is successful in imparting financial literacy, a government should take into consideration this possibility and, in the extreme, even make such courses obligatory for young people. Clearly, this would somehow be at the expense of other subjects, and

* Corresponding author.

E-mail addresses: lorenzo.corsini@unipi.it (L. Corsini), giannaclaudia.giannelli@unifi.it (G.C. Giannelli).¹ The authors contributed equally to all parts of the submitted work.

a government should weigh the pros and cons of such a policy. In any case, for the government to perform such evaluations, it is vital to understand whether teaching general economics contributes to developing financial literacy; our analysis tries to provide evidence to help determine whether this is true and, potentially, worthwhile. We have to stress that our analysis focuses on a “general economics” course, whereas most other analyses take into consideration the effect of courses on finance, financial knowledge or personal finance. This is a specificity that sets our contribution apart from most other research on this subject. The focus on general economics is also particularly valuable from a policy point of view. In fact, the potential introduction of a course whose content is broader in scope, rather than a specialized course in personal finance, would probably generate a more favorable trade-off in regard to removing other subjects from the students’ curricula.

From a methodological point of view, evaluating the effect of attending an economics course on financial literacy can be challenging due to self-selection issues; in fact, it is possible that only individuals who are already informed or who are particularly motivated attend economic and financial courses, which may confound the net effect of the very course. The opposite may also be true. However, the setup of the case that we analyze allows us to overcome this problem.

In the particular case we are studying, we analyze the impact of taking a university course on the financial literacy of law students. The course on which we are basing our analysis is a basic economic course (“*Economia Politica*”) taught in Fall 2014 at the University of Florence to first-year law students (“*Laurea Magistrale a ciclo unico in Giurisprudenza*”). Given that in our particular case, (i) the course is a first-year compulsory course and (ii) it is the only course on economic-related subjects that first-year law students can take, we can be certain that any effect we detect is related to the attendance of the course. Obviously, our results are confined to the effect that attendance can have on law students. However, legal studies are not particularly associated with technical, financial or mathematical skills, and we are therefore fairly confident that our results can be extended at least to most individuals who are enrolled at the university. An extension of the results to the entire population would instead require more caution.

Nonetheless, three forms of caution should be used in interpreting our results. First, a positive effect should be read as the fact that a properly taught course can increase financial literacy, whereas a negligible or negative effect should not necessarily be read as evidence of the impossibility of increasing financial literacy through teaching economics. This finding is observed because we are unable to control the quality of the teaching. Second, while we can observe the total effect of taking the course, we cannot always distinguish between the effect from direct teaching and the effect from transmitting an interest in the subject, prompting students to acquire knowledge elsewhere. While these components may be distinct, in any case, the total effect reaches the desired aim of imparting financial literacy. In truth, as we shall see, our case can provide partial evidence for these two distinct effects. Third, it should be considered that the economic course taught is generic and delivers useful economic information but does not offer any specific information concerning financial markets. Therefore, a course specifically tailored to teach not only basic economics but also some direct financial knowledge could be even more effective, even if it could be more difficult to implement in a general educational career.

To determine the effect of the course, we assess the level of financial literacy for individuals before and after taking the course, and we perform an econometric analysis to evaluate the effect of the treatment, accounting for several socioeconomic variables.

Our results show that attending the economic course has a significantly positive effect on levels of financial literacy. Moreover, the effect is more relevant for categories of individuals who were initially associated with a lower level of financial literacy. Finally, when we only consider the question that was the farthest from the topics taught in the course (that is, the question concerning the Italian pension system), we observe that the rate of correct answers is not significantly higher for treated individuals than for others, suggesting that the improvement in literacy was more related to a strict teaching of economic concepts, rather than to stirring interest in related issues.

From a methodological point of view, our analysis is similar to the assessment of the effect of a treatment, where the treatment is attending the economic course, and the outcome is the level of financial literacy. We exploit the design of the economic course at the University of Florence to build up a quasi-experiment: in fact, students taking this course are divided into separate groups on the basis of their surname, and the groups separately attend the entire course. Some of the groups will make up the treatment groups (and we measure their financial literacy at the end of the course), and the rest will make up the control (and we measure their financial literacy at the start of the course).

For the assessment of financial literacy, this was performed by asking the students standard questions (see [Lusardi and Mitchell, 2011](#)) on nominal interest rates, real interest rates and portfolio diversification, as well as a more specific question about the Italian pension system.

Our analysis and its results fall into a vast body of research on the effect of education on financial literacy. Previous analyses trying to assess the effect of financial courses during high school obtained mixed results, although more recent and better-designed studies seem to point to an overall positive effect of education on financial literacy. Early studies had already shown that students who took high school courses in personal finance or money management were, on average, more financially literate than those who did not take financial courses ([Peng et al., 2007](#); [Mandell, 2008](#); [Mandell and Klein, 2009](#)). However, most of this evidence appears to be descriptive, with composition effects and self-selection issues, preventing the drawing of clear causal conclusions. Studies that are more recent and address these issues confirm the existence of positive effects of financial literacy. [Hospido et al. \(2015\)](#), using a matched sample of students and teachers in Madrid and different estimation techniques, found positive effects on financial knowledge of a 10-hour financial education program among 15-year-old students in compulsory secondary schooling. [Frisancho \(2020\)](#) found that financial knowledge increased as a consequence of a program promoted by the Peruvian government that consisted of special courses offered to students and training offered to teachers at the high school level. The meta-analysis by [Kaiser and Menkhoff \(2020\)](#) on a large number of quasi-experimental studies on programs aimed at improving financial literacy starting from elementary to high schools seems to fully confirm these positive findings.

Other studies show that courses on different financial aspects not only increase financial knowledge but also affect people’s financial behavior. [Bruhn et al. \(2016\)](#), conducting a large-scale randomized control trial study of financial education programs in Brazilian high schools, found significant positive effects of these programs on students’ financial proficiency, savings and use of expensive credit to make consumer purchases. [Brown et al. \(2016\)](#) examined variation in the exposure of young Americans to financial training during high school and found that more exposure reduced reliance on debt and enhanced repayment. [Harvey \(2019\)](#) found that personal finance courses reduced the likelihood and frequency of payday borrowing. [Mangrum \(2020\)](#) found that courses on personal finance during high school increased the

chance of student loan repayment. [Urban et al. \(2020\)](#) show that completing personal finance courses as part of a high school curriculum produced fewer defaults and higher credit scores during adult life.

In addition to the analysis on the effect of financial education during high school courses, other studies tried to understand whether this specific education should be offered to younger students, that is, at the age at which behaviors and beliefs are formed. Several findings mildly support such intuition (see [Mandell 2009](#)). A relevant contribution by [Batty et al. \(2020\)](#) details the consequences of the promotion within elementary and middle school of the so-called “My Classroom Economy”, a simulated economy in which students participate and make financial decisions. According to the authors, students who participated showed great improvements in financial knowledge.

Evidence on the effect of financial courses taken at the university level is quite scarce and unclear, and our work aims to contribute in this direction. [Mandell \(2008\)](#) provides descriptive data, which show that college students who took finance courses were no better off in financial knowledge than were other students, while [Peng et al. \(2007\)](#) find a positive effect of such courses. A more recent study ([Happ et al., 2016](#)) finds that, in Germany, the economic knowledge of students was significantly larger after taking an undergraduate introductory economics course, even if this increase was not present among all students. In any case, these analyses provide few details regarding the exact nature of the courses and on their target groups; therefore, it is difficult to pinpoint the presence or absence of a causal effect. To improve on this evidence, in our work, we try to be particularly careful in detecting a clean-cut effect, taking into account composition effects and self-selection.

Other works investigated the effect of college economic courses on economic behavior: [Lyons \(2008\)](#) finds that students who took financial education courses were less likely to reach credit card limits; this is also detected in [Gutter and Copur \(2011\)](#), who found that students who took the course were more likely to save.

The rest of the paper is organized as follows: section two describes the contents of the economic course, section three provides details on the empirical strategy and on the quasi-experiment design, section four provides a description of the data and of their balancing properties, section five provides empirical results and section six provides the conclusion.

2. Structure of the economic course

The effect we want to measure is related to the attendance of a course on economics. In particular, we focus on a basic course of economics (*Economia Politica*) taken by first-year students enrolled in the law degree at the University of Firenze. The course comprises both microeconomics and macroeconomics topics at an introductory level. Simple math is used, but without much emphasis on the analytical aspects, and graphic analyses are performed. The actual topics covered in the course include the following: demand and supply of goods and services; markets; market failures; public intervention; national income; economic growth; the labor market, unemployment; inflation; international trade; exchange rate; globalization; and the Euro and the European Monetary Union.

We measured the financial literacy of students before and after taking the course by conducting a survey with financial questions prior to and at the end of the course. Comparing the actual course with the questions contained in the survey, the course covered the concepts of nominal interest rates and real interest rates, and it described in general the concept of investments, while it made no reference to pension systems nor delved into particular financial aspects.

From this point of view, great care was taken to avoid the lecturer's being conditioned in her teaching by the very presence of the survey. In particular, the exact content and nature of the questions were not revealed to the lecturer, and she was only informed that a number of questions on economic topics would be asked to the students. Finally, it should be mentioned that this was not the first time the lecturer has given this course and, from her point of view, this was the standard course she gave every year.

3. Empirical strategy and identification of the effect

Our analysis is aimed at detecting and evaluating the effect of attending an economic course on levels of financial literacy. From a methodological point of view, this is similar to the assessment of the effect of a treatment, where the treatment is attending the economic course, and the outcome is the level of financial literacy.

The assessment of financial literacy was performed by asking the students standard questions (see [Lusardi and Mitchell, 2011](#)) on nominal interest rates, real interest rates and portfolio diversification. A more specific question about the Italian pension system was also added to the questionnaire; this was added because, unlike the other questions, the course did not cover this subject, and we wanted to evaluate the effect of the course on economic issues that were not directly explained to the students. All questions were contained in a questionnaire that also asked for information on basic socioeconomic characteristics. The complete text of the financial questions can be found in [Appendix A](#).

We used the number of correct questions to create an index measuring the financial literacy levels of the respondents, representing the share of correct answers (from 0 to 1). A similar index representing the total number of correct answers (from 0 to 4) was also used for the robustness check.

We used this questionnaire to build a quasi-experimental design that exploited the structure of the course to detect the effect of the course. In particular, the degree in law (*Laurea Magistrale a ciclo unico in Giurisprudenza*) contains one compulsory course on economics in the first year. This course is the only economics course taught in the first year and the only compulsory course for all law students; moreover, no courses in mathematics or scientific subjects are offered to them. The fact that this is the only course in economics that students take allows us to avoid the problem of other possible academic sources for the acquisition of financial knowledge. Moreover, by focusing on law students, we restrict the target population to individuals who are not specifically or systematically interested in the economic/financial sector. Finally, it must be stressed that the course is a general course with no particular focus placed on financial content.

Given the large number of students who enroll in the first year of law school at the University of Firenze, three parallel courses exist, each taught by a different lecturer. Students are assigned to these three courses in alphabetical order on the basis of the first letter of their last name and fully attend lectures separately, at different times of the day and with no overlapping of students. We consider students enrolled in these parallel courses as different “groups”, both “treated” groups and “controls”. We have 3 groups: group 1 is the treated group, and groups 2 and 3 are the control groups. In fact, we assessed the before-taking-the-course level of financial literacy (and several other socioeconomic variables) of students belonging to control groups 2 and group 3 at the start of the semester. Next, we assessed the after-taking-the-course level of financial literacy of students belonging to group 1 at the end of the semester (who form our treatment group). The fact that both the treatment and control groups

actually underwent the treatment and that the treated group was selected only on the basis of the first letter of their last name ensures that our experiment is primarily a natural experiment.

This setup allows us to avoid the act of measuring financial literacy (i.e., taking a test on financial literacy) having an effect on the treatment. In this way, we are able to observe the level of literacy after taking the course and the level of literacy of observationally equal individuals at the start of the course.

The only potential risk is that when measuring the literacy of students at the beginning and at the end of the course, we may encounter students who are not similar; in fact, at the end of the course, we may miss students who stopped attending the course or who simply skipped classes (attendance is not compulsory in Italy) and thus have different unobservable characteristics from their counterparts. For example, students who stopped attending or skipped classes may be less motivated than their counterparts. To overcome this problem, we exploited a feature of the course to force “treated” students to be present on the day that the financial literacy survey was (unexpectedly) given. In particular, independent of our survey, the course in economics allows students to split the exam into two parts (i.e., a midterm and a final exam), but this opportunity is restricted to students who actually attend the full course. Such attendance must be proven by signing a record that the lecturer only provides during some random and unannounced lectures. Given that there is a strong preference for students to split the exam into two parts, this mechanism provides an incentive to students to attend all classes (something that is *per se* important to control in our experimental setup), and we further exploited this system by directly announcing on the third to last lecture that in the following lecture, it would be possible to sign the record that allowed them to take the final exam. This approach provided a strong incentive to attend the following lecture, where we also delivered, unexpectedly, the survey on financial literacy.

In other words, our experimental assumption is that during the second lecture, the target population was present and that we forced this target population to be present at the second to last lecture. These were the two occasions when the questionnaire was administered.

Regarding the delivery of the survey, we took care to perform it in an aseptic way. We did not announce the day it would be performed, nor did we mention its existence before or after it was administered. No specific information was provided regarding the reason for collecting this formation. We only informed the students that it would measure their level of economic knowledge. We stressed that the survey was anonymous and that (obviously) none of its results would be used in the determination of their final grade for the course.

After delivering the survey, we use the information gathered to estimate the effect of taking the course, controlling for all sociodemographic characteristics. Given the metrics of the financial literacy variable, we need to estimate the determinants of a proportion (the proportion of correct answers); thus, we estimate a general linear model using a logit link function (this procedure was suggested in Papke and Wooldridge (1996); see also Baum (2008) for a discussion of this issue). This appears to be the best method to perform our estimation; however, if we interpret our variable as the actual level of financial literacy (and not as a proportion), other estimation methods could be used. In particular, to test for robustness, we could also perform the estimation using (i) an ordered probit, which is grounded on the fact that having a higher value for the financial literacy variable simply translates into greater financial literacy with no specific cardinal implications, and (ii) a Tobit regression, which takes into consideration that it is not possible to score more than 4 and less than 0 correct answers. In all cases, we estimate robust standard errors.

4. Descriptive statistics and balancing property of the sample

The primary aim of our analysis is to determine whether attending a basic economic course has an impact on the financial literacy of individuals. Our sample population is 481 students enrolled in the law program at the University of Firenze who were taking the economics course.

The econometric analysis we perform allows us to estimate the effect of the treatment controlling for different covariates associated with each untreated and treated individual. The assignment to the treatment has been done on the basis of the first letter of the surname so that the two groups should display similar sociodemographic characteristics. However, even if unlikely, the surname could also provide systematic differences in these characteristics, especially in terms of place of origin. We report in the table below some descriptive statistics on the variables we use in our analysis, reporting their means among students interviewed before they took the course (307 students that make up the control group) and interviewed after they took the course (174 students that make up the treated group). A *t* test on the means of the two groups is also reported (see Table 1).

As evident from the above table, the two groups are fairly similar in terms of characteristics, and the *t* tests never refuse the hypothesis that the mean of each variable is the same in the two groups, not even in the case of variables related to the place of origin.

To further rule out the possibility of systematic differences and to provide information on how balanced the two groups are, we could perform a preliminary OLS regression where we consider the treatment (taking the course) as the dependent variable and all the other covariates as the independent variables. Large and significant coefficients of this regression would hint at systematic differences in the two groups. We report the full results in Appendix B, but in any case, we do not detect any strong significance in the coefficients, which suggests that our analysis is robust in terms of balancing and assignment to the treatment.

As a further step to describe the difference between the groups, we now turn to the difference we recorded in terms of the correctness of answers to the financial questions. Table 2 reports data on how well the two groups performed in answering.

The table shows that the literacy level is quite variable among the students. Before taking the course, approximately half answered at least 3 questions correctly, whereas the other half did not reach 3 correct answers. The question about the nominal interest and the Italian pension system received a high rate of correct answers, whereas the other two appeared to be more difficult.

Attending the course appears to have improved financial literacy; in fact, the average number of correct answers increases, and the share of correct answers for each question increases. However, there is one exception to this result, that is, the share of correct answers to the question on the pension system was actually slightly lower among students after taking the course.

Obviously, these statistics are merely descriptive, and any evidence may be simply due to the random composition of samples (treated and untreated). To account for compositional effects, we perform an econometric analysis in which we try to determine a direct effect of the exposure controlling for all the different covariates in the untreated and treated groups.

5. Estimation results

We now provide the results of the econometric analysis. As stated before, the dependent variable is the level of financial literacy (measured as the share of correct answers), and the independent variables are a dummy for attending the economic

Table 1
Descriptive statistics for treated and untreated groups.

	Attended the economic course (Treated)		Did not attend the economic course (Control)		t test on the means
	Mean or proportion	Standard deviation	Mean or proportion	Standard deviation	
Demographic Characteristics					
Female	0.633333	0.483509	0.680645	0.466981	0.86
From a region in the south	0.106667	0.309723	0.148387	0.356058	1.25
Born in a foreign country	0.06	0.238282	0.048387	0.21493	-0.51
Both parents with university degree	0.206667	0.406271	0.177419	0.382641	-0.72
Older than first-year student	0.313333	0.465403	0.33871	0.474036	0.45
Previous Secondary Education (classical studies is the reference)					
Commercial studies	0.08	0.272202	0.074194	0.262509	-0.20
Scientific studies	0.28	0.450503	0.270968	0.445178	-0.16
Linguistic studies	0.073333	0.261556	0.080645	0.27273	0.29
Other studies	0.093333	0.291874	0.125807	0.332167	1.04
Final mark in secondary school	80.7619	10.9039	79.16612	11.55953	-1.40
Economic Habits					
Make online purchases	0.713333	0.453719	0.777419	0.416652	1.62
Save something each month	0.593333	0.492857	0.609677	0.488611	0.41
Observations	174		307		

Table 2
Number of correct answers BEFORE and AFTER taking the economics course.

	Relative frequency before the course	Relative frequency after the course
All answers correct	16.50%	25.14%
3 answers correct	39.48%	40.78%
2 answers correct	27.83%	20.11%
1 answers correct	12.94%	11.17%
No answers correct	3.24%	2.79%
	Before the course	After the course
Average correct answers	2.53	2.74

course and several other socioeconomic variables. The econometric analysis allows us to assess whether attending the course had a positive effect on financial literacy and how significant that effect was.

We estimate a general linear model using a logit link function (Papke and Wooldridge, 1996; Baum, 2008), and we also test for robustness by estimating an ordered probit and a Tobit regression. All estimations use robust standard errors. We report the results for these three estimation techniques in Table 3.

All estimation techniques deliver similar results and strongly point to the conclusion that attending the course strictly improved financial literacy. From this point of view, we can certainly claim that a properly taught economics course is successful in imparting a higher level of financial literacy to students. The coefficients in the above table do not directly determine the size of the effect, but if we translate the coefficients in terms of an increase in the number of correct answers, we obtain a value of approximately 0.2 (the similarity of this value with the estimated coefficient is a coincidence, and the value remains similar for all the estimations). Considering that the average number of correct answers is 2.6 with a standard deviation of 1.03, we conclude that taking the economics course increases, on average, the number of correct answers by approximately 0.2 standard deviations. This is actually about the same size that the meta-analysis contained in Kaiser et al. (2020) finds on the effect of financial courses. The other key variables in the determination of financial literacy appear to be those related to previous education. Students whose educational background included some economics or scientific studies have greater financial literacy.² Moreover, students

² In Italy, linguistic studies at the secondary level often encompass the study of economic-related subjects.

Table 3
Estimates of the effect of attending the economics course and of determinants of financial literacy.

	GLM with logit link function	Ordered probit	Tobit
Attended the economics course	0.228** (0.114)	0.230** (0.109)	0.258** (0.124)
Demographic Characteristics			
Female	-0.274** (0.125)	-0.291** (0.119)	-0.357*** (0.130)
From a region in the south	-0.104 (0.146)	-0.125 (0.139)	-0.168 (0.179)
Born in a foreign country	-0.476** (0.204)	-0.489** (0.195)	-0.563** (0.259)
Both parents with university degree	0.188 (0.141)	0.183 (0.133)	0.203 (0.149)
Older than first-year student	-0.117 (0.115)	-0.112 (0.111)	-0.120 (0.129)
Previous Secondary Education (classical studies is the reference)			
Commercial studies	0.727*** (0.206)	0.679*** (0.188)	0.756*** (0.230)
Scientific studies	0.344*** (0.129)	0.340*** (0.125)	0.384*** (0.143)
Linguistic studies	0.480*** (0.181)	0.472*** (0.173)	0.544** (0.222)
Other studies	0.165 (0.170)	0.174 (0.166)	0.220 (0.189)
Final mark at secondary school	0.0138*** (0.00494)	0.0133*** (0.00475)	0.0160*** (0.00531)
Economic Habits			
Make online purchases	0.212* (0.127)	0.206* (0.123)	0.236* (0.139)
Save something each month	0.120 (0.105)	0.123 (0.102)	0.111 (0.121)
Constant	-0.830** (0.407)		1.114** (0.457)
Observations	481	481	481

who performed better in their secondary school also had greater financial literacy.

5.1. Estimation of the effect on different groups of students

Given that students whose studies at the secondary school level had some scientific or economic content display higher

Table 4

Estimates of the effect of attending the economics course for different groups (Group 1: scientific, commercial or linguistic secondary degree; Group 2: other secondary degrees).

	GLM with logit link function	
	Group 1	Group 2
Attended the economics course	0.153 (0.186)	0.268* (0.141)
Demographic Characteristics		
Female	-0.274** (0.125)	
From a region in the south	-0.104 (0.146)	
Born in a foreign country	-0.476** (0.204)	
Both parents with university degree	0.188 (0.141)	
Older than first-year student	-0.117 (0.115)	
Previous Secondary Education (classical studies is the reference)		
Commercial studies	0.727*** (0.206)	
Scientific studies	0.344*** (0.129)	
Linguistic studies	0.480*** (0.181)	
Other studies	0.165 (0.170)	
Final mark at secondary school	0.0138*** (0.00494)	
Economic Habits		
Make online purchases	0.212* (0.127)	
Save something each month	0.120 (0.105)	
Constant	-0.830** (0.407)	
Observations	481	

financial literacy than the rest, it is worth investigating whether the impact of attendance was the same for these two groups of students. In Table 4, we report results for estimations where the effect of the treatment was allowed to be different in the two groups: the first is made of students whose secondary degrees were in scientific, commercial or linguistic studies (203 students), while the second is made of students with secondary degrees in other studies (278 students).

The results are interesting. The magnitude of the effect of taking the course is different for the two groups: even if the difference is not very large, the effect on students with an educational background associated with stronger financial literacy is positive but non-significant. These results could suggest that the economics course was most useful to students whose starting financial literacy was low, and from this point of view, the course could act as a re-equilibrating instrument on the level of literacy. Our analysis is too thin to assert this with certainty (the difference is quite small), but this is an issue that may be worth further investigation.

5.2. Estimation of the effect on different questions

The final issue that we want to explore is whether the effect of the course was homogeneous on all dimensions of financial literacy or whether the gain was observed only in certain aspects related to the context of the course. We already mentioned that the first three questions concerned issues that were at least generally treated in the course, whereas the fourth was related to an issue (pension systems) that was not part of the course. To explore this dimension, we produce estimations: (i) only for the

determinant of the correctness of question 4 (estimating a logit model) and (ii) on the determinants of financial literacy measured on the basis of the first three questions only. In all cases, we directly distinguish the effect that the course had on students coming from scientific, commercial and linguistic schools from the rest of the students. The full results are presented in Appendix C, and they highlight that the effect of attending the course on correctly answering the question on the pension system was negligible, whereas the overall effect on the other three questions was even stronger³ than when we considered the four questions. Moreover, these new estimations strengthen the finding that group 2 is the main beneficiary of the gain in financial literacy.

Finally, we also perform estimations on every single question: we report these results in Appendix C (for simplicity, we do not distinguish between groups defined in previous studies). The findings are quite in line with the total financial literacy result: the effect of taking the economic course is always positive, although it is more significant in the case of the question on real interest rates than on the others (where the coefficients are significant only at the 10% threshold). Even the rest of the characteristics maintain the same sign⁴ even if the statistical significance varies from answer to answer.

6. Conclusions

In this paper, we investigated the effect of attending a university-level course on the financial literacy of individuals. The specific course was a compulsory basic economics course attended by law students, the only course on economic-related subjects that they had taken. The specific nature and organization of the course allowed us to avoid problems of self-selection (or, at least, to confine them to the self-selection of studying law and not attending this course). Our results showed that individuals' financial literacy improved after taking the course, and this increase was mostly relevant (i) for individuals with an educational background usually associated with lower financial literacy and (ii) when the financial issues were related to topics closer to what was actually taught in the class.

Given that self-selection issues should not arise in our experimental design, we are confident that the effect we found can be considered causal. However, we must mention that we cannot fully control for the effort the students made when answering the questions and for possible spillover effects (i.e., word of mouth between students of different groups). The former should not compromise the causal effect because a possible lack of effort should be symmetric across treated and untreated individuals. Although we cannot fully control for spillover effects, we must stress that the different groups of students attend the rest of their academic courses separately so that the opportunity for communication by word of mouth is quite limited.

From a policy point of view, a properly taught course can indeed improve financial literacy and provide a positive piece of evidence on possible policies promoting financial education in schools. Moreover, we show that such courses would be particularly useful for individuals with educational backgrounds associated with lower financial literacy. Given the relevance of financial knowledge in ensuring economic well-being, this also suggests redistributive and equalitarian reasons for promoting such policies. Clearly, our results are confined to a specific subsample of

³ Even if we do not present here estimations for each question, they confirm the fact that the effect on the first three questions is positive and significant for group 2 and generally non-significant for group 1.

⁴ There is a single exception to this: "other studies" turn out to have a negative (but non-significant) effect on answering the first question correctly.

the population; therefore, further research would be useful to assess the effect of similar courses on individuals drawn from different contexts. In any case, law students belong to a field of study where analytical subjects are not the main focus, so that it would not be too much of a stretch to imagine similar findings for other sectors that have an analogous approach toward analytical content, including medicine, literature and political science. For our specific context, lawyers certainly have to deal with economic issues so that any gain in financial literacy is valuable for this category of professional and probably for all of society.

Finally, while we have suggested that teaching economics has a beneficial effect, this could possibly come at the expense of studying other fields of knowledge. To assess the consequences of this displacement effect is clearly beyond the scope of this paper: we merely suggest that economics may be a worthwhile addition to students' careers.

Appendix A

These are the questions that the students in the financial literacy survey were asked. Solutions are 3, 2, 1, 2.

(1) Suppose you had \$100 in a savings account and the interest rate was 2% per year with no further bank commission. After 2 years, how much do you think you would have in the account if you left the money to grow?

- || Less than 102 euro
- || Exactly 102 euro
- || More than 102 euro
- || Do not know

(2) Suppose you have \$100 in a savings account and the interest rate is 1% per year with no further bank commission. Also suppose that inflation rate is 2%. If you withdraw all your money from the account in exactly a year do you think you will be able to buy the same amount of goods you will be able to buy today with 100 euro?

- || Yes, I will be able to buy exactly the same amount
- || No, I will be able to buy less than the same amount
- || No, I will be able to buy more than the same amount
- || Do not know

(3) Which investment strategy, for a given amount of money, entails higher risk of losing your money?

- || To invest all your money in stocks in only one company.
- || To invest all your money in stocks from more than one company
- || The above two strategies have the same degree of risk
- || Do not know

(4) According to the current Italian pension system that would be applied when you will retire, your pension will be computed according to the following

- || The salary you are paid during the last few years of your working career
- || The contributions paid during your whole working career
- || None of the two
- || Do not know

Appendix B

In our quasi-experiment, the assignment to the treatment group was done on the basis of the first letter of the surname so that the two groups should display similar sociodemographic characteristics. However, even if unlikely, the surname could also provide systematic differences in these characteristics: from this point of view, the main difference could potentially come from the place of origin. We report full descriptive statistics for the two groups in Appendix B and, to further rule out the possibility of systematic differences and to provide information on how

Table B.1

OLS regression of all sociodemographic characteristics on the assignment to the treatment group.

	OLS
Demographic Characteristics	
Female	-0.0657 (0.0496)
From a region in the south	-0.0949 (0.0628)
Born in a foreign country	0.0891 (0.106)
Both parents with university degree	0.0182 (0.0602)
Older than first-year student	-0.00328 (0.0492)
Previous Secondary Education (classical studies is the reference)	
Commercial studies	0.00745 (0.0869)
Scientific studies	0.00140 (0.0539)
Linguistic studies	-0.0376 (0.0841)
Other studies	-0.0852 (0.0721)
Final mark at secondary school	0.00358* (0.00198)
Economic Habits	
Make online purchases	-0.0943* (0.0538)
Save something each month	-0.0198 (0.0456)
Constant	0.184 (0.170)
R ²	0.02
Observations	481

balanced the two groups are, we perform a preliminary OLS regression where we consider the treatment (taking the course) as the dependent variable and all the other covariates as the independent variables. Large and significant coefficients of this regression would hint at systematic differences in the two groups. We report the results in Table B.1.

The estimation suggests that no coefficient is significant at the 5% threshold so that there is no clear difference between the two groups; the R² of the regression is nearly zero (0.02), providing evidence that exposure to the treatment is not explained by the socioeconomic characteristics we observe. There are two coefficients that have a very weak significance (10%); they are likely due to random composition and, more importantly, the coefficient related to the final grade is extremely small, so that any difference in this aspect is basically negligible. The coefficients related to the place of origins of the students are strictly nonsignificant so that, even in this case, the concerns related to the selection into treatment groups on the basis of the surname appear to be unfounded. These results, together with the fact that in the regression for financial literacy, we actually control for all the covariates, seem to suggest that our analysis is robust in terms of balancing and assignment to the treatment group.

Appendix C

In Table C.1, we report the results from estimating (i) only the determinant of the correctness of question 4 (estimating a logit model) and (ii) the determinants of financial literacy measured on the basis of the first three questions only.

In Table C.2, we report the results from separately estimating the determinants of correctly answering each of the first three standard questions.

Table C.1

Estimation of the effect of attending the economics course on the question about the pension system and other questions.

	Correct answer on question 4		Financial literacy on the basis of the first three questions	
	Group 1	Group 2	Group 1	Group 2
Attended the economics course	-0.182 (0.340)	-0.231 (0.269)	0.260 (0.208)	0.435*** (0.168)
Demographic characteristics:				
Female	-0.107 (0.223)		-0.354** (0.139)	
From a region in the south	0.368 (0.324)		-0.170 (0.156)	
Born in a foreign country	-0.115 (0.412)		-0.431* (0.226)	
Both parents with university degree	0.00729 (0.223)		-0.168 (0.127)	
Older than first year student	0.834* (0.479)		0.768*** (0.224)	
Previous Secondary Education (classical studies is the reference)				
Commercial studies	0.385 (0.296)		0.412*** (0.158)	
Scientific studies	0.243 (0.418)		0.629*** (0.225)	
Linguistic studies	0.236 (0.323)		0.221 (0.190)	
Other studies	0.00589 (0.00918)		0.0161*** (0.00548)	
Final mark at secondary school	-0.0244 (0.253)		0.293* (0.169)	
Economic Habits				
Make online purchases	0.154 (0.238)		0.233* (0.140)	
Save something each month	0.231 (0.213)		0.0709 (0.120)	
Constant	0.0413 (0.772)		-0.989** (0.444)	
Observations	481		481	

Table C.2

Logit estimation for the answer to individuals questions.

	Correct answer on question 1 (Compound interest)	Correct answer on question 2 (Real interest)	Correct answer on question 3 (Diversification of risk)
Attended the economic course	0.382* (0.232)	0.524** (0.205)	0.386* (0.213)
Demographic characteristics:			
Female	-0.486** (0.247)	-0.429** (0.213)	-0.207 (0.220)
From a region in the south	-0.317 (0.315)	0.240 (0.291)	-0.504* (0.288)
Born in a foreign country	-0.0848 (0.429)	-0.114 (0.402)	-1.072*** (0.409)
Both parents with university degree	0.408 (0.293)	0.0490 (0.244)	0.506* (0.264)
Older than first-year student	-0.189 (0.231)	-0.239 (0.209)	-0.150 (0.215)
Previous Secondary Education (classical studies is reference)			
Commercial studies	1.155** (0.520)	0.655* (0.382)	0.535 (0.409)
Scientific studies	0.355 (0.266)	0.620*** (0.235)	0.113 (0.240)
Linguistic studies	0.0605 (0.406)	0.898** (0.377)	0.740* (0.414)
Other studies	-0.150 (0.330)	0.680** (0.313)	0.0435 (0.317)
Final mark at secondary school	0.0325*** (0.0101)	0.0114 (0.00874)	0.00797 (0.00900)
Economic Habits			
Make online purchases	0.127 (0.251)	0.00865 (0.230)	0.573** (0.231)

(continued on next page)

Table C.2 (continued).

	Correct answer on question 1 (Compound interest)	Correct answer on question 2 (Real interest)	Correct answer on question 3 (Diversification of risk)
Save something each month	0.339 (0.220)	-0.234 (0.199)	0.384* (0.204)
Constant	-1.754** (0.822)	-0.729 (0.730)	-0.788 (0.754)
Observations	481	481	481

References

- Almenberg, J., Säve-Söderbergh, J., 2011. Financial literacy and retirement planning in Sweden. *J. Pension Econ. Financ.* 10 (04), 585–598.
- Batty, M., Collins, J.M., O'Rourke, C., Odders-White, E., 2020. Experiential financial education: A field study of my classroom economy in elementary schools. *Econ. Educ. Rev.* 78.
- Baum, C.F., 2008. Stata tip 63: Modeling proportions. *Stata J.* 8(2), 299–303.
- Brown, M., Grigsby, J., Van Der Klaauw, W., Wen, J., Zafar, B., 2016. Financial education and the debt behavior of the Young. *Rev. Financ. Stud.* 29 (9), 2490–2522.
- Bruhn, M., de Souza Leao, L., Legovini, A., Marchetti, B., 2016. The impact of high school financial education: Evidence from a large-scale evaluation in Brazil. *Am. Econ. J. Appl. Econ.* 8 (4), 256–295.
- Frisancho, V., 2020. The Impact of School-Based Financial Education on High School Students and their Teachers: Experimental Evidence from Peru. IDB Publications (Working Papers, 8835).
- Gutter, M., Copur, Z., 2011. Financial behaviors and financial well-being of college students: Evidence from a national survey. *J. Fam. Econ. Issues* 32 (4), 699–714.
- Happ, R., Zlatkin-Troitschanskaia, O., Schmidt, S., 2016. An analysis of economic learning among undergraduates in introductory economics courses in Germany. *J. Econ. Educ.* 47 (4), 300–310.
- Harvey, M., 2019. Impact of financial education mandates on Younger consumers' use of alternative financial services. *J. Consum. Aff.* 53, 731–769.
- Hospido, L., Villanueva, E., Zamarro, G., 2015. Finance for All: The Impact of Financial Literacy Training in Compulsory Secondary Education in Spain IZA Discussion Papers 8902.
- Jappelli, T., Padula, M., 2011. Investment in financial literacy and saving decisions. *J. Bank. Financ.* 27 (08), 2779–2792.
- Kaiser, T., Lusardi, A., Menkhoff, L., Urban, C., 2020. Financial Education Affects Financial Knowledge and Downstream Behaviors, NBER Working Paper No. w27057.
- Kaiser, T., Menkhoff, L., 2020. Financial education in schools: A meta-analysis of experimental studies. *Econ. Educ. Rev.* 78.
- Lusardi, A., Michaud, P., Mitchell, O.S., 2011. Optimal Financial Literacy and Saving for Retirement, Working Papers, Vol. 905. RAND Corporation Publications Department.
- Lusardi, A., Mitchell, O.S., 2011. Financial literacy around the world: an overview. *J. Pension Econ. Financ.* 10 (04), 497–508.
- Lyons, A.C., 2008. Risky credit card behavior of college students. In: Xiao, Jing (Ed.), *HandBook of Consumer Finance Research*, second ed. Springer International Publishing, Switzerland, pp. 185–207.
- Mandell, L., 2008. The Financial Literacy of Young American Adults: Results of the 2008 National Jump\$ Tart Coalition Survey of High School Seniors and College Students. Jumpstart Coalition, Washington, DC.
- Mandell, L., Klein, L.S., 2009. The impact of financial literacy education on subsequent financial behavior. *J. Financial Counseling Planning* 20 (1), 15–24.
- Mangrum, D., 2020. Personal finance education mandates and student loan repayment. mimeo.
- Papke, L.E., Wooldridge, J.M., 1996. Econometric methods for fractional response variables with an application to 401 (K) plan participation rates. *J. Appl. Econometrics* 11, 619–632.
- Peng, T.C.M., Bartholomae, S., Fox, J.J., Cravener, G., 2007. The impact of personal finance education delivered in high school and college courses. *J. Family Econ. Issues* 28, 265–284.
- Spataro, L., Corsini, L., 2017. Endogenous financial literacy, saving and stock market participation. *Finanzarchiv* 73 (1), 1–28.
- Urban, C., Schmeiser, M., Collins, J.M., Brown, A., 2020. The effects of high school personal financial education policies on financial behavior. *Econ. Educ. Rev.* 78.
- Walstad, W., Urban, C., Asarta, C.J., Breitbart, E., Bosshardt, W., Heath, J., O'Neill, B., Wagner, J., Xiao, J.J., 2017. Perspectives on evaluation in financial education: Landscape, issues, and studies. *J. Econ. Educ.* 48 (2), 93–112.