Does Financial Literacy Increase Students' Perceived Value of Schooling?

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Penn Demography

Motivation

- Solid body of research shows that:
  - Financial illiteracy among the youth is **widespread** (Chen and Volpe 1998; Lusardi, Mitchell, and Curto 2010)
  - Poor financial decisions on the part of students have serious consequences for **later-life outcomes** (Brown et al. 2016; Lusardi and Tufano 2015)

- Very little is known about how financial literacy at young ages interacts with **school-related outcomes**, i.e. school outcomes in the teenage years

- Little research has focused on financial literacy as a skill shaping students' perceptions of the intrinsic **value of education**

- This study builds on the premises that:
  - Financial literacy embodies a multi-dimensional set of skills that originate early in life in the context of the **family**
  - Financial literacy is shaped throughout the life course by means of interactions with the external context, including **schools**

Research question

- Schooling is the most traditional form of human capital **investment**
- Financial literacy skills entail the ability to assess/discern whether an investment is **worthwhile** or not
- In this paper I explore whether more financially literate students place a higher **value** on schooling relative to their less literate counterparts
- I posit that students with higher financial literacy might be more aware of the:
  - Financial and non-financial (psychological and opportunity) **costs** that education entails
  - Monetary and non-monetary (occupational prestige) **returns** that it yields
- No variable perfectly captures the the value that students attribute to schooling:
  - *Proxy 1*: Time commitment to education
    - Measures of truancy
    - Time spent doing homework
  - *Proxy 2*: Attitudes towards school

Context

- OECD 2012 Programme for International Student Assessment (PISA)
- 15-year-old high school students
- 29,000 students
- 18 OECD and non-OECD countries
- The study focuses on **Italy** → interesting **case study**:
  - Of the 18 countries included in PISA 2012, Italy occupies the second-lowest rank (mean FL score of 466 – **500** is the OECD average)
  - Italy is the country with the highest number of schools sampled (1,158) and the highest number of students within schools (7,068)
  - Dataset for Italy includes regional identifier that allows to exploit **regional-level** information + parent-level questionnaire

Preview of findings

- Marked **regional** differences in financial literacy (FL) skills – Southern regions perform very **poorly**
- Higher financial literacy increases students' perceived value of schooling by boosting their **time commitment to education**
  - Lower levels of unjustified absences and class delays with higher FL
  - More time devoted to homework with higher FL
- Plausibly causal - Robust to a series of different individual- and regional-level instrumental variables (**IVs**)
- No robust evidence that financial literacy shapes students' **attitudes** towards school
- Young adolescents' **behavior** might be easier to measure objectively than **attitudes**

Literature

1. Financial literacy as predictor of later-life behavior
   - Wealth accumulation, debt load, retirement planning, stock market participation
   - Role of childhood experiences as root drivers of financial literacy (Grohmann, Kouwenberg, and Menkhoff 2015) and role of financial socialization (Jorgensen and Savla 2010; Shim et al. 2010).
   - Claim: Scant research on financial literacy as predictor of earlier-life outcomes – before entering the labor market
2. Financial literacy in schools
   - Descriptive assessments of how well-informed people are before entering the labor market
   - Experimental evidence quantifying impacts of FinEd programs → mixed evidence
   - Claim: Scant research on the interplay between financial literacy skills and school-related outcomes such as performance, effort, motivation, etc.
3. Dealing with endogeneity in financial literacy research using IVs
   - Three groups: (1) family background and financial knowledge of peer group; (2) information on past education and previous financial knowledge; (3) natural experiments
   - Controversy on effect size OLS vs IVs estimates

Data and variables

- OECD PISA 2012 for Italy – representative at **national** and **regional** level
- PISA samples designed in a **two-stage stratified** fashion
- Sampled schools selected with equal probability **43** students, **35** of whom completed core assessment, and **8** were administered the FL module
- PISA adopts an **age-based** definition – 15y/3m to 16y/2m, regardless of grade
- Student-level and school-level surveys → parent-level surveys included in Belgium, Croatia, and Italy
- Financial literacy measured in PISA using a mixture of multiple-choice and constructed-response questions in three areas: *content*, *processes*, and *contexts*
- Single scale of proficiency drawing on all questions
- One **proficiency level** (PL) corresponds to a **75-unit increase** on a 0-1000 financial literacy scale – level 2 is the international baseline proficiency level

Proficiency levels

Measures

Variable	Wording	Coding
a. Time commitment to education		
Truancy		
Late for school	In the last two full weeks of school, how many times did you arrive late for school?	0: None 1: Once or twice 2: Three or four times 3: Five or more times
Skip whole day	In the last two full weeks of school, how many times did you skip a whole school day?	
Skip classes	In the last two full weeks of school, how many times did you skip some classes?	
Time spent on activities		
Homework out of school	Thinking about all school subjects: on average, how many hours do you spend each week on homework or other study set by your teachers?	Hours per week
b. Attitudes		
Attitudes towards school		
Prepare for life	School has contributed to prepare me for adult life	1: Strongly disagree 2: Disagree 3: Agree 4: Strongly agree
Valuable time	School has not been a waste of time	
Confidence	School has helped give me confidence to make decisions	
Prepare for college (acad.)	Trying hard at school will help me get into a good college	
Get a job (vocat.)	Trying hard at school will help me get a good job	

- Attitude indices created as row means and through PCA by **school type**

Descriptive

Methodological concerns

- PISA 2012 is **cross-sectional** → relationship between financial literacy and outcomes of interest likely to be **endogenous**

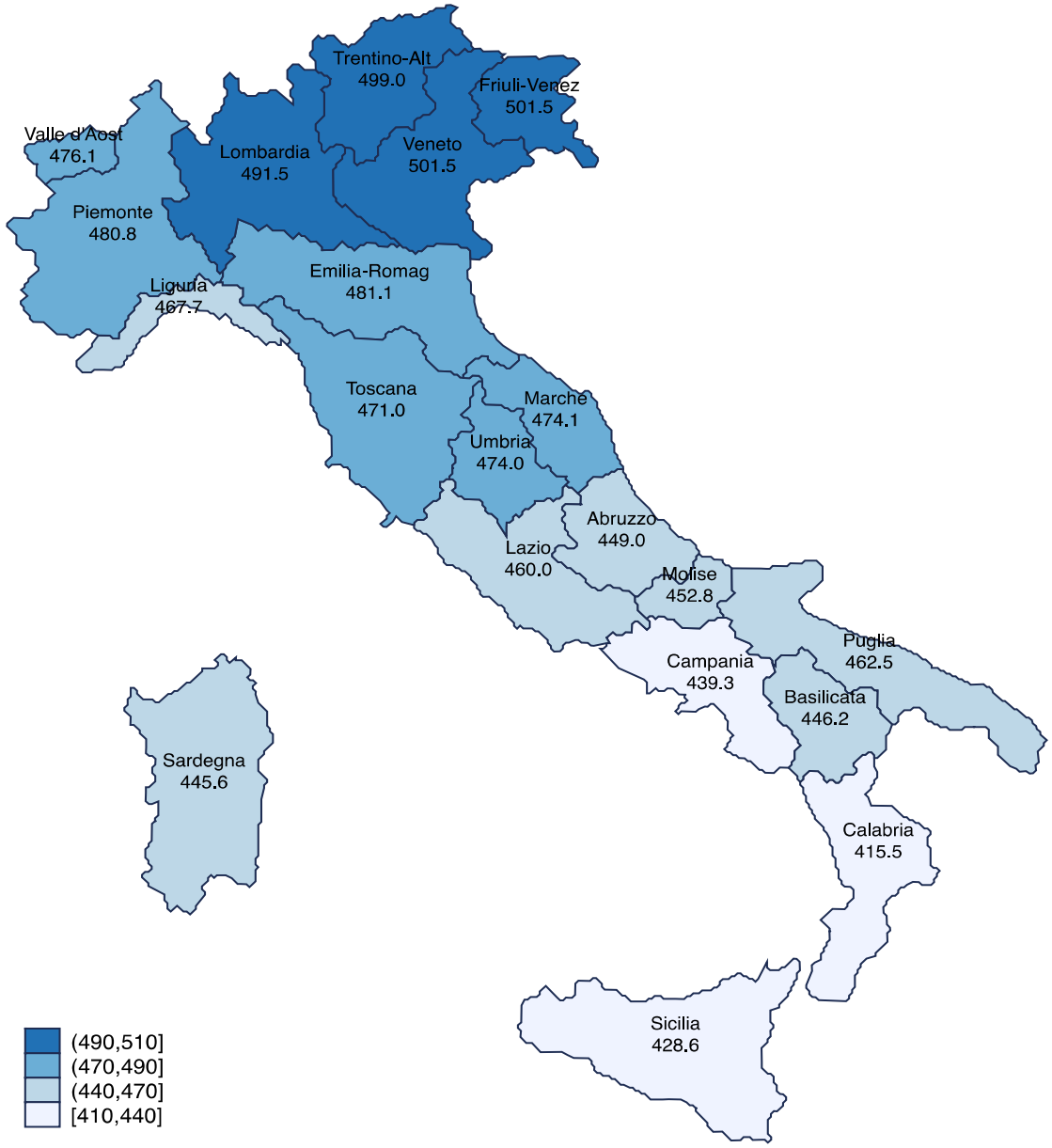
1. Reverse causation
   - Higher motivation to study might make children more financially literate
   - This directionality more likely to hold for math and reading in Italy
   - Financial education very rarely offered in Italian schools – FL more of a by-product of financial socialization within family and out-of-school settings
   - Italy is among the countries in which variation in FL is **least** explained by variation in math and reading skills
2. Omitted variable bias
   - Unobserved ability
   - Personality traits
3. Measurement error → can bias estimates of the impacts of FL to zero

Methodological approach

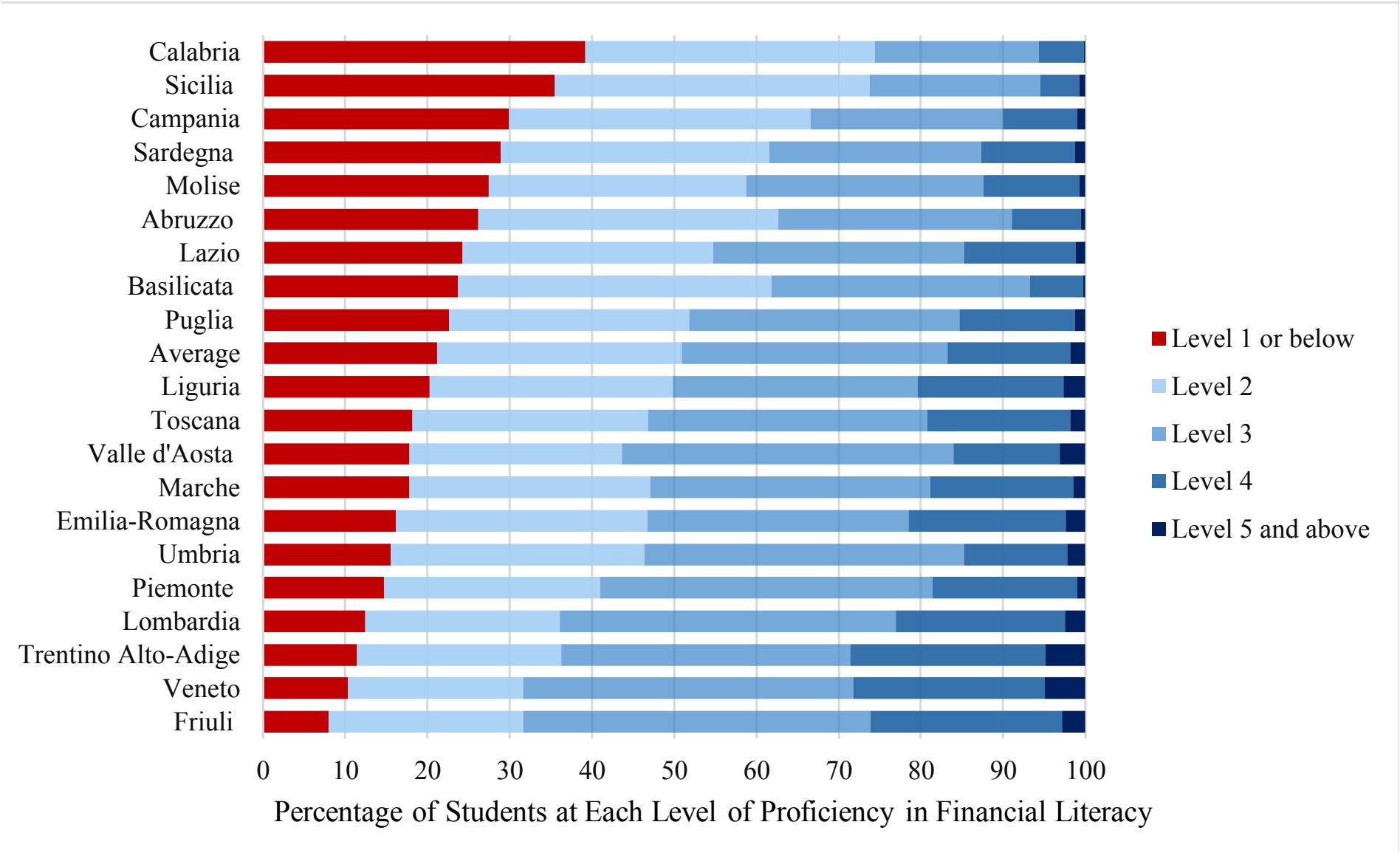
- Ordinary Least Squares (OLS) complemented by 2-Stage Least Squares (2SLS) Instrumental Variable (IV) approaches
- OLS controlling for individual (gender, age, grade attained), household (SES, household composition), school-level (school type, orientation, class size, school size, student-teacher ratio) + regional dummies
- **Individual-level IVs** → use school-level info excluding info pertaining to student him/herself (FL + General OECD database)
  - *Share* of a student's schoolmates whose mothers work in direct contact with money flows
  - *Share* of a student's schoolmates whose fathers work in direct contact with money flows
- **Regional-level IVs**
  - *Share* of circulating newspapers with finance-related content (*ilSole24ore*) in 2012 (Accertamenti Diffusione Stampa)
  - *Growth* of ATM branches between 2010 and 2012 (Bank of Italy and SIOTEC)
  - *Number* of bankruptcies in 2012 (Bank of Italy and Italian Ministry of Justice)

Regional-level IVs

Financial literacy by region



Financial literacy (PL) by region



Results (1)

Dependent variable	Financial Literacy (PL)		
	(1)	(2)	(3)
	OLS	**Individual-level IVs**	**Individual and Regional-level IVs**
a. Time commitment to education			
Truancy			
Late for school	-0.047***	-0.225***	-0.234***
(SE)	(0.016)	(0.075)	(0.063)
Regional dummies	Yes	Yes	No
F-test (first stage)	.	13.40	19.73
Hansen J. (p-value)	.	0.110	0.506
Skip whole day	-0.044***	-0.248***	-0.270***
(SE)	(0.014)	(0.065)	(0.054)
Regional dummies	Yes	Yes	No
F-test (first stage)	.	14.01	20.24
Hansen J. (p-value)	.	0.174	0.554
Skip classes	-0.036***	0.007	-0.056
(SE)	(0.011)	(0.059)	(0.049)
Regional dummies	Yes	Yes	No
F-test (first stage)	.	13.38	20.13
Hansen J. (p-value)	.	0.550	0.045
Time spent on activities			
Homework out of school	1.304***	3.329***	1.380**
(SE)	(0.168)	(1.275)	(0.596)
Regional dummies	Yes	Yes	No
F-test (first stage)	.	10.52	14.92
Hansen J. (p-value)	.	0.231	0.101

Results (2)

b. Attitudes			
Attitudes towards school - acad.	0.025	-0.021	-0.073
(SE)	(0.017)	(0.092)	(0.065)
Regional dummies	Yes	Yes	No
F-test (first stage)	.	11.54	14.04
Hansen J. (p-value)	.	0.234	0.410
Attitudes towards school - vocat.	0.072***	-0.068	-0.039
(SE)	(0.015)	(0.061)	(0.056)
Regional dummies	Yes	Yes	No
F-test (first stage)	.	8.11	11.57
Hansen J. (p-value)	.	0.012	0.206

First stage

Robustness checks

1. Alternative **individual-level IVs** more closely related to money management ✓
   - *Share* of schoolmates who learned how to manage money in a specific course in school
   - *Share* of schoolmates who learned how to manage money in an activity outside of school
   - *Share* of schoolmates who discuss about money matters with their parents at least once a week

   → Limitation: questions asked to only 50% of the sample and only in the FL module

2. Is **math** driving all of this? ~ ✓
   - Conduct similar analysis using math as predictor and IVs for math
     - *Share* of schoolmates whose parents help them on math homework at least once per month
     - *Share* of schoolmates whose parents discuss about their child's performance in math class at least once per month

Robustness

Summary of findings

1. Higher financial literacy increases students' perceived value of schooling by boosting their **time commitment to education**
   - An increase of one PL implies a reduction in school delays and school absences by 0.23 and 0.27 of a day per two-week period
     - Converted to *annual terms*, a coefficient of 0.27 implies a reduction of about 4.5 days lost per year
   - An increase of one PL is associated with 1 to 3 additional hours per week spent on out-of-school study time
     - Converted to *annual terms*, a coefficient of 1 to 3 translates into 34 to 102 additional hours on homework per year
   - Larger effect size using IV relative to OLS
2. No robust evidence that financial literacy shapes students' **attitudes** towards school
   - At odds with the belief that changes in attitudes are a precondition for changes in behavior (Ajzen 1001; Armitage and Conner 2001)
   - Measurement error? Attitudes unstable at young ages? FL more "practical" skill?

Implications

- Existing research showing that time commitment to education affects subsequent **educational outcomes** – dropout, academic achievement, etc.
- FL as focused on decision-making, the value of time, the role of incentives and rewards, the importance of savings, etc. → "awareness-raising" skill
- This study highlights role of financial literacy as a **driver** of human capital accumulation
- Straightforward to expect positive **spillover effects** on later-life outcomes such as the choice of occupation, wealth, earnings, savings, retirement preparedness…

Policy

- Focus on FL still largely absent from school curricula in Italy
- Highest policy priority is in the Southern regions
- Strengthen FE interventions by complementing students' academic training since young ages

Appendix

Proficiency levels

Proficiency level and lower cut score	Task descriptions
Level 5 625	Students can apply their understanding of a wide range of financial terms and concepts to contexts that may only become relevant to their lives in the long term. They can analyze complex financial products and can take into account features of financial documents that are significant but unstated or not immediately evident, such as transaction costs.
Level 4 550	Students can apply their understanding of less common financial concepts and terms to contexts that will be relevant to them as they move towards adulthood, such as bank account management and compound interest in saving products. They can interpret and evaluate a range of detailed financial documents, such as bank statements, and explain the functions of less commonly used financial products.
Level 3 475	Students can apply their understanding of commonly used financial concepts, terms and products to situations that are relevant to them. They begin to consider the consequences of financial decisions and they can make simple financial plans in familiar contexts.
Level 2 400	Students begin to apply their knowledge of common financial products and commonly used financial terms and concepts. They can use given information to make financial decisions in contexts that are immediately relevant to them.
Level 1 326	Students can identify common financial products and terms and interpret information relating to basic financial concepts. They can recognize the difference between needs and wants and can make simple decisions on everyday spending.

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Descriptive statistics

	N	Mean	(SD)	Min	Max
Outcomes					
Late for school	7,029	0.50	(0.77)	0	3
Late for school (dummy)	7,029	0.37	(0.48)	0	1
Skip whole day	7,026	0.59	(0.69)	0	3
Skip whole day (dummy)	7,026	0.49	(0.50)	0	1
Skip classes	7,019	0.43	(0.66)	0	3
Skip classes (dummy)	7,019	0.35	(0.48)	0	1
Homework out of school*	4,547	8.75	(7.09)	0	30
Attitudes towards school (index) - acad.*	2,397	3.13	(0.46)	1	4
Attitudes towards school (index) - vocat.*	2,166	3.00	(0.51)	1	4

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Regional-level IVs

Region	Share of newspapers with finance content over total volume in 2012	Growth of ATM branches between 2010 and 2012	Number of bankruptcies in 2012
North-West			
Liguria	0.033	-0.013	257
Lombardia	0.022	-0.015	2,613
Piemonte	0.013	-0.006	881
Valle d'Aosta	0.017	0.021	17
North-East			
Emilia-Romagna	0.014	-0.021	950
Friuli-Venezia Giulia	0.012	-0.015	253
Trentino-Alto Adige	0.017	-0.003	137
Veneto	0.013	-0.010	1,021
Center			
Lazio	0.016	-0.009	1,252
Marche	0.014	-0.033	417
Toscana	0.012	-0.002	786
Umbria	0.015	0.019	210
South			
Abruzzo	0.012	-0.020	281
Basilicata	0.015	0.008	55
Calabria	0.016	-0.025	285
Campania	0.012	-0.005	950
Molise	0.011	0.000	42
Puglia	0.012	-0.008	497
Islands			
Sardegna	0.044	0.001	242
Sicilia	0.011	-0.037	610

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First stage

	Individual-level IVs		Individual and Regional-level IVs
	(1)	(2)	(3)
Share of schoolmates whose *mothers* work in money-related occupations	5.295***	4.466***	4.950***
	(0.669)	(0.682)	(0.665)
Share of schoolmates whose *fathers* work in money-related occupations	5.969***	5.472***	5.803***
	(0.629)	(0.670)	(0.642)
Share of newspapers with finance content over total volume in 2012			8.389*
			(4.307)
Growth of ATM branches between 2010 and 2012			7.767***
			(2.055)
Number of bankruptcies in 2012			0.000*
			(0.000)
Constant	5.703***	5.550***	5.586***
	(0.052)	(0.087)	(0.112)
Regional dummies	No	Yes	No
F-test	118.03	19.63	53.52
Observations	6,653	6,653	6,653
R-squared	0.137	0.183	0.147

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Robustness checks

Dependent variable	RC1 - Financial Literacy (PL)		RC2 - Math (PL)	
	(1)	(2)	(1)	(2)
	Individual-level IVs	**Individual and Regional-level IVs**	**OLS**	**Individual-level IVs**
a. Time commitment to education				
Truancy				
Late for school	-0.244*	-0.196**	-0.041**	-0.161
(SE)	(0.144)	(0.095)	(0.016)	(0.111)
Regional dummies	Yes	No	Yes	Yes
F-test (first stage)	10.60	10.21	.	10.15
Hansen J. (p-value)	0.172	0.169	.	0.071
Skip whole day	-0.255**	-0.296***	-0.059***	-0.192*
(SE)	(0.128)	(0.099)	(0.011)	(0.105)
Regional dummies	Yes	No	Yes	Yes
F-test (first stage)	9.94	10.20	.	10.88
Hansen J. (p-value)	0.167	0.428	.	0.098
Skip classes	-0.127	-0.137	-0.029***	-0.041
(SE)	(0.117)	(0.087)	(0.010)	(0.097)
Regional dummies	Yes	No	Yes	Yes
F-test (first stage)	10.59	10.76	.	11.14
Hansen J. (p-value)	0.205	0.303	.	0.054
Time spent on activities				
Homework out of school	2.718**	2.164**	0.834***	1.560*
(SE)	(1.279)	(0.857)	(0.119)	(0.890)
Regional dummies	Yes	No	Yes	Yes
F-test (first stage)	10.06	10.18	.	10.64
Hansen J. (p-value)	0.495	0.081	.	0.606

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