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The financial capability of 15-year-olds in Greece☆

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ABSTRACT

We conduct the first nationally representative measurement of the financial capability of 15-year-old students in Greece. We find discrepancies between the core, the islands, and the periphery of the country. Female students score lower in terms of all knowledge, behaviour, and attitudes. Students in experimental schools, the better performing ones, and those with more educated parents are more financially capable, reflecting the absence of a dedicated personal-finance curriculum. Awareness of household finances is positively related to financial capability. Local economic conditions matter, with students in regions affected more by the economic crisis of 2008–2016 exhibiting lower financial capability.

1. Introduction

Financial capability it is the combination of knowledge, attitudes, and behaviours that is conducive to sound financial decisions and ultimately to personal/household financial well-being (G20, 2012; Atkinson and Messy, 2012). Our study conducts the first nationally-representative Pan-Hellenic measurement of financial-capability introducing a novel state-of-the-art survey instrument.[1] The study of financial capability among high-school students in Greece is timely for several reasons. First, Greece is at the stage of designing its national-financial-education-strategy and our study aims to inform this strategy. Second, Greece did not participate in the financial knowledge module of the Programme for International Student-Assessment (PISA). However, in 2018, the index of students' cognitive adaptability in Greece was one of the lowest among PISA-participating countries and economies. In the 20 remaining participating countries, only one out of three students were able to evaluate a bank statement. Third, Greece is coming out of a major economic crisis, experiencing the highest deterioration in macroeconomic indicators amongst developed nations.[2] Cucinelli et al. (2019) and Bottazzi and Lusardi (2021) show that the regional environment matters for financial knowledge.

2. Data and regional analysis

We generated a novel survey instrument, based on a questionnaire designed by experts, following OECD/INFE (2016a,b) and related literature.[3] Along with measuring socioeconomic characteristics, we adopted the approach by OECD/INFE (2016a) to include 7 questions on financial knowledge, 7 questions on financial behaviour, and 3 questions on financial attitudes. These are presented in Table A.1, along with their sources.

The sample of schools was designed to be nationally representative at the regional administrative level via proportional stratified random sampling. We were granted approval for contacting the 260 high schools that participate in PISA. 96 schools responded to the invitation (36.9%). The questionnaire was administered online, and 3,529 15-year-old students were invited to

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[1] In previous works, Tsakiridou and Seitanidis (2019) surveyed 300 18-year-old students in Thessaloniki and Philippas and Avdoulas (2019) surveyed 456 university students in Piraeus.

[2] The Appendix Fig. A.1 presents the evolution of key macroeconomic and financial market indicators for Greece in the last 20 years.

[3] The access to the junior-high-school-population was granted by the Hellenic Ministry of Education, Research and Religious Affairs, under approval number 41396/Δ2/09-03-16.

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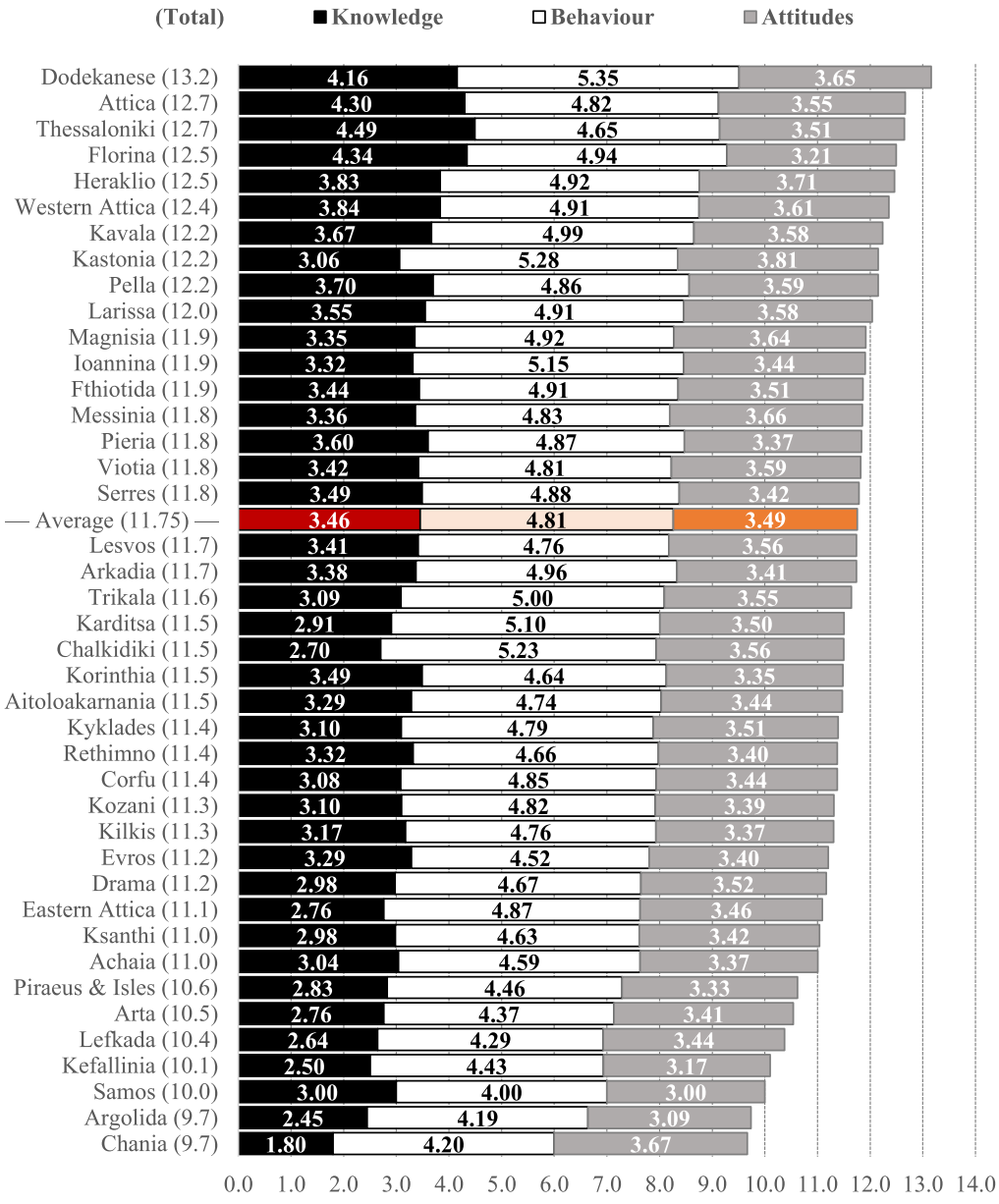

Fig. 1. Youth financial capability by prefecture.

complete it supervised during a class in information technology. 3,028 complete responses were received between March–June 2016. Hence, our sample covers all 13 administrative regions of Greece, and 41 out of 55 prefectures. We generate multistage-sampling weights that enable within-stratum adjustments to account for the numbers of prefectures, schools, and 15-year-old students sampled within each Greek administrative region. Our weights sum to the population of 105,525 15-year-olds.

Correct responses to the 14 questions on knowledge and behaviour give rise to a score of 14. The 3 attitudinal-questions entail responses on a Likert scale ranging between 1 (lowest) and 5 (highest). Their average score is added to the total, generating a financial capability score with a maximum of 19 points. Following OECD/INFE (2016a), the acceptable level of financial capability is a minimum of 70% proficiency, i.e., $\geq$13.

Table 1 presents the averages of our main variables, unweighted in column 1 and weighted in column 2. Indicatively, our raw data oversamples females (50.9%), while weighting corrects to the population average (48.7%). The sample comprises of 13.7% non-Greek nationals. 94% attend public schools, with 92.2% attending day schools. 84.6% come from two-parent households, and 81.2% receive pocket money of €9.58 on average. 45% are aware of their household's income, and 67.3% report that the crisis has induced financial constraints to their household.

31.7% (869/3,028) scored above the 70% threshold. The weighted scores were 11.75 in total, 3.46 on knowledge, 3.49 on behaviour, and 3.48 on attitudes. Fig. 1 reports the scores across the 41 prefectures, along with the overall average. Dodekanese islands have the highest score (13.2), followed by the two most densely-populated prefectures of Attica and Thessaloniki. Florina, Heraklio, Western Attica, Kavala, Kastoria, Pella and Larissa have the next highest scores above 12. At the bottom of the distribution are Chania (9.7), Argolida (9.9), and Samos (10.0). The Ionian-island prefectures of Kefallinia (10.1) and Lefkada (10.4)

Table 1
Descriptive-statistics.

	Unweighted	*Weighted*		*Unweighted*	*Weighted*
Financial-capability - Total	11.66	11.75	Financial-capability:-≥70%	30.32%	31.73%
Financial-knowledge - Total	3.39	3.46	Financial-knowledge - Score	−0.001	0.034
Financial-behaviour - Total	4.79	4.81	Financial-behaviour - Score	−0.001	0.021
Financial-attitudes - Total	3.48	3.49	Financial-attitudes - Score	−0.001	0.002
Female	50.9%	48.7%	Migrant	13.3%	13.7%
Grade-Point-Average	16.65	16.64	Two-parent-household	84.7%	84.6%
Grade-repetition	3.3%	3.4%	Father's-education	11.40	11.45
Private-school	5.1%	6.1%	Mother's-education	12.00	12.09
Public-school	94.9%	94.0%	Income-knowledge	45.9%	45.0%
School-type: Day	93.9%	92.2%	Financially-constrained-by-crisis	68.0%	67.3%
−″-:-Art	0.2%	0.3%	Pocket-money	81.8%	81.2%
−″-:-Music	1.6%	1.0%	#Pocket-money	9.65	9.58
−″-:-Experimental	4.3%	6.5%			
$GDP^{Prefecture}_{per-capita(2016)}$	15,246.8	15,608.3	$Unemployment^{Admin.\ Region}_{2016}$	23.3%	23.5%
$\Delta GDP^{Prefecture}_{per-capita(2006-2016)}$	2,323.0	2,067.8	$\Delta Unemployment^{Admin.\ Region}_{2016-2006}$	14.1%	14.4%
$Deposits^{Prefecture}_{per-capita(2016)}$	9,514.1	9,632.8	$\%\ Employment^{Admin.\ Region}_{Financial-sector(2016)}$	3.1%	3.3%
$\Delta Deposits^{Prefecture}_{per-capita(2006-2016)}$	4,015.0	4,669.1	$\%\ Entrepreneurship^{Admin.\ Region}_{2016}$	7.7%	7.5%
			$\%\ Educated^{Admin.\ Region}_{Post-secondary(2016)}$	36.7%	38.6%

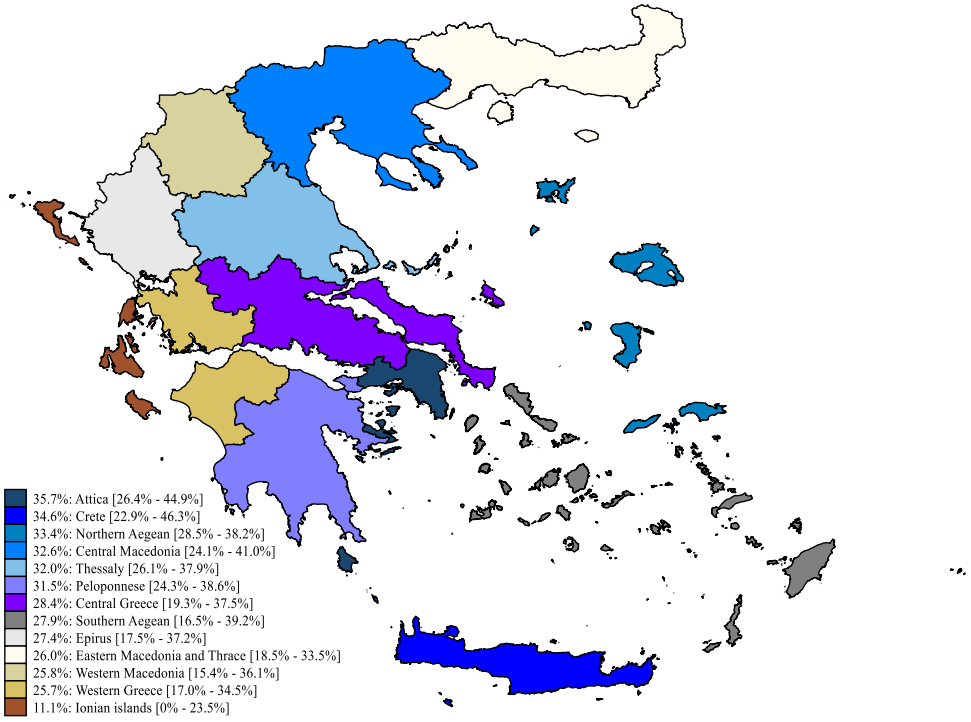

Fig. 2. Youth financial capability across administrative regions.

also score among the lowest, along with Arta (10.5), Piraeus & Isles (10.6), Achaia (11.0) and Ksanthi (11.0).

Fig. 2 reports the percentage reaching the 70%-threshold across the 13 administrative regions. 35.7% in the most densely populated Attica reached the threshold. Then, Crete (34.6%), Northern Aegean (34.6%), Central Macedonia (32.6%), Thessaly (32.0%), and Peloponnese (31.5%) are among the top. Fewer than 30% reached the threshold in Central Greece (28.4%), Southern Aegean (27.9%), Epirus (27.4%), Eastern Macedonia and Thrace (26%), Western Macedonia (25.8%), and Western Greece (25.7%). An alarming 11.1% reached the threshold in the Ionian Islands.

3. Multivariate linear regression analysis

We perform multivariate linear regression analysis to examine the determinants of student financial capability. We have four response variables, namely (1) *FC*: a dummy variable, valued 1 if the student scored ≥70%; (2) *FK*: a financial-knowledge score out of 7; (3) *FB*: a financial-behaviour score out of 7, and; (4) *FA*: a financial-attitude score, as the average of the 3 related ordinal responses ∈ [0, 5]. Scores (2)-(4) are transformed into continuous indices using principal component analysis (PCA) based on polychoric correlations for binary/ordinal data.[4] Our equation has the

[4] All results are robust without the PCA transformation.

Table 2
Multivariate regression.

	Financial capability (≥70%correct)	Financial-knowledge score	Financial-behaviour score	Financial-attitude score
	(1)	(2)	(3)	(4)
Female	−0.047***	−0.176***	−0.182***	−0.094*
	[0.016]	[0.038]	[0.033]	[0.054]
Migrant	0.011	−0.035	−0.090*	0.034
	[0.024]	[0.050]	[0.053]	[0.069]
Grade point average	0.057***	0.189***	0.052***	0.111***
	[0.005]	[0.016]	[0.012]	[0.014]
Grade repetition	−0.023	−0.126	−0.233	0.055
	[0.040]	[0.145]	[0.141]	[0.144]
School-type: Experimental	0.324***	1.337***	0.540***	0.763***
	[0.018]	[0.044]	[0.040]	[0.046]
−″−:Art/Music	−0.201***	−0.256	0.189	−0.737
	[0.036]	[0.214]	[0.738]	[0.633]
−″−:Day	{*Ref.*}	{*Ref.*}	{*Ref.*}	{*Ref.*}
Private school	−0.060***	0.047	0.464***	−0.591***
	[0.018]	[0.040]	[0.040]	[0.047]
Two-parent household	−0.040*	−0.034	0.052	−0.096
	[0.023]	[0.071]	[0.055]	[0.082]
Father's education	0.006***	0.020***	0.007	0.011*
	[0.002]	[0.006]	[0.005]	[0.007]
Mother's education	0.003	0.015***	0.010*	0.006
	[0.002]	[0.006]	[0.005]	[0.005]
Income knowledge	0.099***	0.329***	0.188***	0.245***
	[0.019]	[0.058]	[0.039]	[0.056]
Income decline perception	0.081***	0.295***	0.077*	0.179***
	[0.018]	[0.047]	[0.043]	[0.053]
#Pocket-money	−0.001	−0.007**	−0.011***	0.005
	[0.001]	[0.003]	[0.002]	[0.003]
School-FE	+	+	+	+
Var(Dependent-variable)	0.177***	1.176***	0.789***	1.282***
	[0.005]	[0.035]	[0.024]	[0.030]
$Cov(\varepsilon_{1,2})$, $-Cov(\varepsilon_{1,3})$, $-Cov(\varepsilon_{1,4})$	–	0.302***	0.133***	0.171***
		[0.009]	[0.008]	[0.008]
$Cov(\varepsilon_{2,3})-Cov(\varepsilon_{2,4})$	–	–	0.647***	0.784***
			[0.026]	[0.029]
$Cov(\varepsilon_{3,4})$	–	–	–	0.182***
				[0.018]
#Observations (Population)	*3,028 (105,525)*			

form:

$$f_i^j = X_{ik}\beta_k^j + \varepsilon_i^j \quad (1)$$

where $f_i = (FC_i^1, FK_i^2, FB_i^3, FA_i^4)^T$, $\beta_k = (\beta_0^j, \beta_1^j, \ldots, \beta_k^j)^T$, and $\varepsilon_i = (\varepsilon_i^1, \varepsilon_i^2, \varepsilon_i^3, \varepsilon_i^4)^T$, for *i=1,…,3,028*, and *j=1,2,3,4*. Here, f_i^j is the value observed for the *j*th dependent variable for the *i*th-student, and ε_i^j is the error term corresponding to the *j*th dependent variable on the *i*th student. We allow each f_i to have its own linear relationship with all the *k* characteristics in the vector X_{ik}, which include school, student, family, characteristics, along with school fixed effects. β denotes the $(k+1)\times 1$ vector of parameters corresponding to the *k*th independent variable. The model allows for an association among the error terms $\left(\varepsilon_i^1, \varepsilon_i^2, \varepsilon_i^3, \varepsilon_i^4\right)$ corresponding to individual *i*, assuming multivariate normality for the error vectors.

Table 2 presents the estimates of our model. The estimates show a significant gender difference in overall financial capability, and in its three-facets. Girls are some 14.5% less financially capable on average, as indicated by the division of the coefficient (−0.047) by the linear prediction of the model (0.3173) in column 1. Student performance at school is related positively to financial capability and its three facets. Students in experimental schools perform better in terms of financial capability in all aspects. This is likely to reflect the absence of a dedicated personal finance curriculum in public-schools, for which experimental schools might compensate via extracurricular student assignments. Students in private schools seem to be performing worse, although there is a discrepancy between their higher behavioural scores and their lower attitudinal scores. The years of education of the parents are related-positively to financial capability, with those of the father exhibiting a higher impact than those of the mother in column 1. Knowledge of household income and perception of financial constraints induced by the crisis are positively related to financial capability. Finally, a higher amount of pocket money exerts a negative impact on the scores of financial knowledge and behaviour.

In Table 3, we augment our model with regional macroeconomic indicators from the Bank of Greece and the Hellenic Statistical Authority. Panels A-I present selected coefficients from nine multivariate linear regressions. In panels A-B, $GDP^{Prefecture}_{per\text{-}capita(2016)}$ is positively related to financial capability and financial knowledge. The deterioration in $\Delta GDP^{Prefecture}_{per\text{-}capita(2006\text{-}2016)}$ is associated negatively with financial capability and knowledge. In panels C-D, higher $Deposits^{Prefecture}_{per\text{-}capita(2016)}$ are associated positively with financial capability and knowledge, while the decline in $\Delta Deposits^{Prefecture}_{per\text{-}capita(2006\text{-}2016)}$, also exacerbated by the imposition of capital controls in 2015, exerts a significant negative impact on financial capability and all three components.

In panels E-F, higher $Unemployment^{Admin.Region}_{2016}$ is associated negatively with financial capability and knowledge, while it exerts a smaller negative impact on financial behaviour. The increase in $\Delta Unemployment^{Admin.Region}_{2016\text{-}2006}$ exerts a higher negative impact on financial capability, knowledge and behaviour. Finally, in panels G-I, $\%Employment^{Admin.Region}_{Financial\text{-}sector(2016)}$,

Table 3
Regional environment and financial capability.

	Fin. capability (≥70% correct)	Fin. knowledge score	Fin. behaviour score	Fin. attitude score
	(1)	(2)	(3)	(4)
(A) $GDP^{Prefecture}_{per-capita(2016)}$	0.135***	0.344***	0.019	0.199
	[0.023]	[0.064]	[0.016]	[0.170]
(B) $\Delta GDP^{Prefecture}_{per-capita(2006-2016)}$	−0.138***	−0.443***	−0.081	−0.264
	[0.036]	[0.095]	[0.057]	[0.160]
(C) $Deposits^{Prefecture}_{per-capita(2016)}$	0.091***	0.263***	0.038	0.087
	[0.022]	[0.069]	[0.029]	[0.117]
(D) $\Delta Deposits^{Prefecture}_{per-capita(2006-2016)}$	−0.604**	−1.672***	−0.149**	−1.352*
	[0.259]	[0.622]	[0.069]	[0.796]
(E) $Unemployment^{Admin.\ Region}_{2016}$	−0.105***	−0.275***	−0.019*	−0.154
	[0.017]	[0.048]	[0.011]	[0.131]
(F) $\Delta Unemployment^{Admin.\ Region}_{2016-2006}$	−1.854***	−4.832***	−0.333*	−2.712
	[0.306]	[0.836]	[0.186]	[2.312]
(G) % $Employment^{Admin.\ Region}_{Financial-sector(2016)}$	0.737***	1.921***	0.132*	1.078
	[0.122]	[0.333]	[0.074]	[0.919]
(H) % $Entrepreneurship^{Admin.\ Region}_{2016}$	0.138***	0.360***	0.025*	0.202
	[0.023]	[0.062]	[0.014]	[0.172]
(I) % $Highly-educated^{Admin.\ Region}_{Post-secondary(2016)}$	0.102***	0.267***	0.018*	0.150
	[0.017]	[0.046]	[0.010]	[0.128]

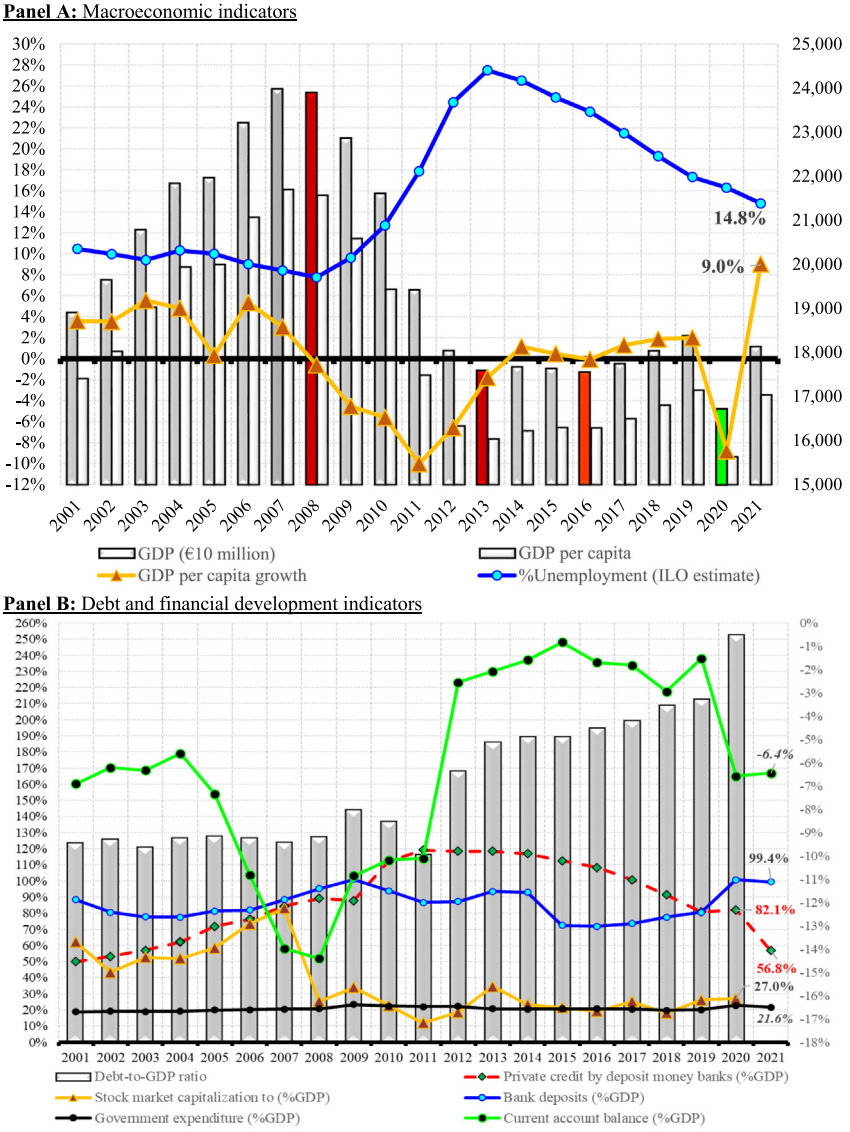

Fig. A.1. Economic and financial development in Greece (2001-2021).
Notes: The macroeconomic data is from the World Bank's World Development Indicators, and the financial development data is from the World Bank's Financial Structure database.

$Entrepreneurship^{Admin.Region}_{2016}$, and $Highly\text{-}educated^{Admin.Region}_{Post\text{-}secondary(2016)}$ are all positively associated with reaching the 70% threshold. They exert a higher impact on financial knowledge, and a smaller impact on financial behaviour.

4. Concluding remarks

For a national strategy for financial education to be fulfilled, it is essential to identify the needs and gaps via measurement, so as to target the groups that might lag, especially the young (Atkinson, 2018). Our evidence shows that there is a significant gender gap in the financial capability of 15-year-olds in Greece, and large discrepancies with higher scores in the core and lower scores in the western and eastern peripheries of Greece. Prefectures and administrative regions lagging in economic and financial development and those affected more by the crisis exhibit lower student financial capability. Hence, a national strategy for financial education can prioritize on the periphery and the regions and populations that were affect the most by the crisis. The current curriculum, which entails a generic home-economics course for ages 13–14 and lacks a personal-finance component does not seem to foster financial capability, as less than one-third of students are able to reach the international 70% threshold. Despite our data being collected in 2016, at the peak of the economic crisis, we consider our findings timely in view of the absence of any nationally representative measurement of the financial capability of 15-year-olds until today. Moreover, the challenges to the financial capability of the students induced by the economic crisis are likely to be exacerbated at present and the future by the uncertainty induced by the pandemic and the cost-of-living crisis.

Data availability

Data will be made available on request.

Acknowledgments

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Appendix

See Fig. A.1 and Table A.1.

Table A.1
The financial capability questionnaire.
This table presents the specifics of the 17 questions of the financial capability questionnaire, along with their sources. The superscript of each numbered question denotes the following sources: A: Happ et al. (2022); B: Hira and Mugenda (1999a); C: Hira and Mugenda (1999b); D: Jump$tart Survey (Mandell, 2008); E: Kempson et al. (2006); F Klapper et al. (2015); G: OECD (2014a); H: OECD (2014b); I: OECD/INFE (2016a); J: OECD/INFE (2011); K: OECD (2012). FK denotes the 7 questions on financial capability, FB denotes the 7 questions on financial behaviour, and FA denotes the 3 questions on financial attitudes.

Question	Weighted average	Wording	Response categories
$FK_1^{K,G}$	39.2%	Ms. Triantafyllou did not make any international call and complained to the company about the relevant charge. If the mobile subscriber fee remains the same, how much should the payment amount be (including VAT) at the new/corrected mobile bill?	(a) 22; (b) 24; (c) 24.2; (d) 25. *(Mobile phone bill statement was provided)*
$FK_2^{K,G,E}$	62.6%	Suppose you saw the same laptop as an offer at two different electronics stores. The original price of the laptop is € 500. One store offers a discount of € 60 from the original price, while the second store offers a 10% discount from the original price. Which offer is better?	(a) €50; (b) €60; (c) 10%; (d) None, the discount is the same.
FK_3^{D}	48.7%	Dinos just found a job with a net income of €1,000 per month. Every month, Dinos has rent expenses of €400 and supermarket expenses of €150. Also, the travel expenses on a monthly basis amount to €150. If Dino's monthly expenses include €50 for his cell phone, €100 for restaurants and €100 for everything else, how long will it take him to save €200.	(a) 4 months; (b) 3 months; (c) 2 months; (d) 1 month.
$FK_4^{J,I,F}$	44.1%	Mary wants to invest some of her money. What do you think is safer, to put all the money she wants to invest in one company or to put that money in different companies?	(a) In a single company because this investment is safer; (b) In different companies because this investment is safer; (c) I don't know which one is safer.
FK_5^{F}	59.9%	Assume that Alexander needs to borrow €100. What is the lowest amount he will have to repay?	(a) €104; (b) €105; (c) €100 plus interest; (d) 3%; (e) €100 plus interest; (f) 4%.
FK_6^{F}	62.9%	Suppose that after 10 years the prices of goods and services have doubled. At the same time, the money Dimitris receives after 10 years has doubled. Dimitris in 10 years will be able to buy:	(a) More products and services than today; (b) Exactly the same products and services; (c) Less products and services than today; (d) I don't know what he will be able to buy.
$FK_7^{J,I,F}$	26.3%	Evita's parents gave her €100 as a birthday present and with this money they opened a family bank account (joint account) with an annual interest rate of 10%. If no movement takes place in the account, this money in five years will be:	(a) More than €150; (b) Exactly €150; (c) Less than €150; (d) Don't Know/Don't Answer.
FB_8^{J}	57.0%	Which of the following describes you the most?	(a) I save the same amount every month; (b) I only save when I have extra money left; (c) I save only when I want to buy something; (d) I don't save; (e) I have no money to save.

(*continued on next page*)

Table A.1 (*continued*).

Question	Weighted average	Wording	Response categories
FB_{9}^{H}	90.5%	Before I buy anything, I first consider whether I can buy it or not:	(a) Yes; (b) No
FB_{10}^{H}	86.5%	Do I compare prices before I buy anything?	(a) Yes; (b) No
FB_{11}^{H}	36.2%	When I don't have enough money to buy something that I really want (e.g., t-shirt, toy, new sneakers, etc.):	(a) I ask my parents for money; (b) I ask my friends/family members for money; (c) I buy it with money that was intended for some other obligation/purchase (d) I don't buy it.
FB_{12}^{I}	58.8%	I manage myself my own financial issues:	(a) Yes; (b) No
$FB_{13}^{B,C}$	74.7%	I am able to cover my daily expenses	(a) Yes, I am able to cover my daily expenses; (b) Most of the times I am able to cover my expenses (c) I am almost never able to cover my expenses; (d) No, I am not able to cover my expenses.
$FB_{14}^{B,C}$	76.9%	I am saving for my future (e.g., studies, buying a car, etc.):	(a) Systematically; (b) Rarely; (c) I do not agree with the concept of savings; (d) I have no money and no savings.
FA_{15}^{A}	3.13	I like finance as a class subject or subject of information	(a) Strongly Disagree; (b) Disagree; (c) Neither agree nor disagree; (d) Agree; (e) Strongly Agree
FA_{16}^{A}	3.92	Knowledge of finances helps to resolve issues in your daily life	(a) Strongly Disagree; (b) Disagree; (c) Neither agree nor disagree; (d) Agree; (e) Strongly Agree
FA_{17}^{A}	3.42	Knowledge of finances helps you to "make" money	(a) Strongly Disagree; (b) Disagree; (c) Neither agree nor disagree; (d) Agree; (e) Strongly Agree

Appendix B. Supplementary data

Supplementary material related to this article can be found online at https://doi.org/10.1016/j.econlet.2023.111044.

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