Financial literacy for financial resilience: Evidence from Cyprus during the pandemic period

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Abstract

This study takes Cyprus as a case country to examine the role of financial literacy for financial resilience in the pandemic period. Responses to the survey questions to assess the level of financial literacy show that in 2021 less than 4 out of 10 respondents had a good financial knowledge proficiency level. The results also show that more than 1 out of 3 Cypriots are financial fragile, *i.e.*, would not have been able to cover an unexpected financial need within a month without borrowing or asking for financial help. Moreover, about 6 out of 10 do not have a rainy-day fund to cover three months living expenses in case of losing their main source of income. The proportions are higher for young, unemployed, low-income, and larger households, indicating that these subgroups were the least resilient. These findings suggest that many Cypriot households were ill-prepared to face the economic consequences of the COVID-19 pandemic. Most importantly, the findings indicate that financial knowledge proficiency appears as a strong antecedent of one's proclivity of being financially resilient. An important policy implication of the study's conclusions is that financial education could help households to improve their financial resilience and prepare for future shocks.

Keywords: financial literacy; financial resilience; financial fragility; rainy-day funds; COVID-19; personal finance; financial education

1. Introduction

Around the world, people face a range of challenges when managing their money and making decisions in the complex and highly digitalized financial landscape that has evolved in recent years (OECD, 2020b). At the same time, individuals and households need to be more engaged with their own financial planning than ever before. For example, in almost every country in the globe, longer life expectancy

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means individuals need to ensure that they accumulate savings to cover their income, care and health needs in older age (Hopkins and Pearce, 2019; Kumar, Shukla, and Sharma, 2019). Throughout their life, they may also need to be resilient to changing circumstances such as job loss and ill health, or economy-wide issues such as fluctuating economic conditions.

Failing to meet these challenges can have negative implications for individuals and households and could potentially lead to large-scale financial instability. This point was made during the Global Financial Crisis, where various observers argued that low levels of financial literacy among consumers contributed to poor financial decisions with negative spillover effects (Gerardi, 2010; OECD, 2009). There followed a broader recognition among policymakers that financial literacy could be a crucial element for ensuring financial stability and fostering economic development. This was underscored by the G20 leaders' endorsement of the OECD/INFE High-level Principles on National Strategies for Financial Education in 2012.

In addition to the attention paid to financial literacy, policy makers with responsibility for financial consumers are also becoming increasingly aware of the importance of assessing financial resilience and its opposite, financial fragility, particularly in light of the COVID-19 pandemic and the increased cost-of-living faced by consumers in many countries. The 2020 OECD/INFE International Survey of Adult Financial Literacy, for example, includes a whole chapter on resilience (OECD, 2020b), while the G20 Global Partnership on Financial Inclusion (GPFI) has updated its financial inclusion action plan and monitored the resilience of migrants, micro, small and medium enterprises and other potentially vulnerable group during the worst of the pandemic. Several studies have identified indicators that can be used to quantify current levels of resilience or fragility considering the potential impact of financial shocks (see, for example, Bialowolski, Weziak-Bialowolska, and McNeely 2021; CFPB 2022; OECD 2020a; UK Office for National Statistics 2020) or the ability to cope financially when faced with a sudden fall in income or unavoidable rise in expenditure (Financial Capability, 2019). Such information is beneficial both for policy makers seeking to implement evidence-based policies that support vulnerable consumers and for academics developing deeper understanding of the underlying concepts.

Research indicates that more financially resilient households are more likely to report financial satisfaction and general wellbeing, as well as better mental and physical health (Bialowolski et al., 2021; Taft, Hosein, Mehrizi, and Roshan, 2013; Wilson, Lee, Fitzgerald, Oosterhoff, Sevi, and Shook, 2020). European Union Statistics on Income and Living Conditions (EU-SILC) confirm this pattern in Cyprus, showing a general improvement in households' ability to make ends meet between 2013 and 2018 and the largest increase in both general life satisfaction and financial satisfaction and across the EU-27. Even so, it seems that many people in Cyprus have been living day by day. Whilst about 30% across the EU reported that they would not be able to cover an unexpected mid-size expense euros in 2019, in Cyprus this situation was a reality for almost half of all households (47.6%). Evidently, few households had created a rainy-day fund, and financial fragility was a problem even before the COVID-19 pandemic.

The sudden negative shock on people's wealth and the scale of the change brought about by the COVID-19 pandemic left consumers in a precarious situation. In Cyprus, sectors such as tourism and hospitality were particularly badly hit by the travel restrictions intended to reduce the spread of the virus, leading to a significant

drop in income. By 2021, almost one in five people in Cyprus had resorted to borrowing to make ends meet, and a further 23% reported that they were extremely concerned about being able to pay their bills the following month, according to EU-SILC data. These results echo a Eurofound survey, which reported that in the first quarter of 2021, one in five households in Cyprus were having difficulty meeting their financial obligations; significantly higher than the EU-27 average of 12%.[1]

These consumer level data provide valuable information about the financial fragility of people in Cyprus. However, they do not provide sufficient information about possible drivers or solutions. With this in mind, we developed an in-depth survey instrument to explore variations in financial fragility and, its opposite, financial resilience in more detail, by incorporating measures of financial knowledge relevant for decisions about saving, investing, and borrowing (the key elements required to build financial resilience) and questions about how respondents' circumstances had changed over time. This approach is consistent with various studies from around the world that have found that higher levels of financial knowledge are associated with holding more money in savings and investments and borrowing less (Lusardi and Tufano, 2015; Van Rooij, Lusardi, and Alessie, 2011). Our paper is also relevant to the literature that shows that financial resilience is strongly linked to financial literacy (Clark, Lusardi, and Mitchell, 2021; Lusardi, Hasler, and Yakoboski, 2021), including Erdem and Rojahn (2022) recent paper exploring financial resilience in France, Germany, Italy, and Spain during the pandemic. Finally, it is also relevant to the context of Cyprus since the studies by Andreou and Philip (2018) and Andreou and Anyfantaki (2021) have documented that financial literacy levels are low in Cyprus, and that people who lack financial knowledge are more likely to fail to effectively manage credit card debt, tend to be more susceptible to financial fraud and face lower likelihood to manage their money through digital channels.

The fieldwork for our survey was implemented in May 2021, collecting data from 840 individuals aged 25-64 and living in Cyprus. We build on the studies by Andreou and Philip (2018), and Andreou and Anyfantaki (2021) and employ a financial knowledge scale to measure one's understanding of basic concepts including interest rates, inflation, risk, diversification, and banking issues. We employ a standard question as in prior studies to measure financial fragility (Demertzis, Domínguez-Jiménez, and Lusardi, 2020; Clark et al., 2021; Lusardi et al., 2021), accordingly, whether an individual has the resources to meet an unexpected mid-size emergency expense without borrowing. We also provide complementary analysis regarding an individual's capacity to cover three months of living expenses due to an income loss through a rainy-day fund (OECD, 2020b; Deevy, Streeter, Hasler, and Lusardi, 2021). Consistent with the existing literature our analysis considers variations across various socio-demographic groups that are financially vulnerable due to low levels of financial inclusion and financial literacy. These include women, youth, rural inhabitants, the unemployed, those with a low level of education, and low-income groups (Atkinson and Messy, 2013, 2015; Lusardi and Mitchell, 2008; OECD, 2020a,d).

This study's findings make two contributions. First, using a much larger base of survey respondents corresponding to working adults and more recent survey evidence than other studies in Cyprus, it adds to the conclusions of extant studies that the level of financial knowledge proficiency in Cyprus during the COVID-19

[1] www.eurofound.europa.eu/publications/annual-report/2022/living-and-working-in-europe-2021.

period remains low and that this problem is heightened among younger individuals. Specifically, our results show that about 36.3% of respondents have a good financial knowledge proficiency level, very close to the 36.9% reported by Andreou and Philip (2018) and the 37.33% reported by Andreou and Anyfantaki (2021). These findings also complement the results of the survey conducted in 2018 by the Central Bank of Cyprus, which has been used as the basis to benchmark Cyprus against the financial literacy scores as reported in OECD (2016b) and to develop a National Strategy to treat the problem (approved by the Council of Ministers in June of 2022).[2] More specifically, Cyprus has an average score of 4.78 out of 7, whilst according to the OECD methodology, a score of at least 5 out of 7 is required for an individual to be considered as financially knowledgeable.

Second, it documents a strong positive relation between financial knowledge proficiency level and the likelihood of being financially resilient in the pandemic period. This evidence adds to the results of a burgeoning literature that investigates the role of financial literacy in enabling people to better handle economic shocks and misfortunes in crisis periods across various countries (*e.g.,* Lusardi, Schneider, and Tufano 2011; Lusardi et al. 2021; Clark et al. 2021; Brown, Collins, and Moulton 2022; Erdem and Rojahn 2022; Loschiavo and Graziano 2022). More importantly, our findings show that many Cypriot households were ill-prepared to face the economic consequences of the COVID-19 pandemic and indicate that financial illiteracy has significantly contributed to making people less financially resilient during crisis periods.

At the policy level, our findings lend credence to the notion that helping people to understand financial matters from a young age could help them to avoid financial vulnerability during future adverse events. In this vein, our paper provides more evidence to support recommendations consistent with the Cyprus Financial Literacy National Strategy, that financial education could help households to improve their financial resilience and prepare for future shocks. Accordingly, if the youth of today receive formal training on how to better manage their money, they are more likely to make informed decisions throughout their adult lives and identify opportunities to increase their financial resilience.

The remainder of the paper is structured as follows. Section 2 discusses the design of the research. Section 3 presents findings about the levels of financial literacy and the link with financial fragility. Section 4 focuses on the availability of rainy-day funds. Section 5 draws conclusions and offers policy suggestions.

2. Research Design

2.1 Questionnaire design

To achieve the research objectives, a survey was conducted using an instrument developed by the authors in the Greek language. The developed questionnaire was administered among Cypriot citizens of ages 25-64 through a (random digit dialing) telephone survey conducted by the Insights Market Research (IMR Cyprus) in May

[2] In Greek: www.centralbank.cy/images/media/pdf2/Report-Summary-English0001.pdf

2021.[3] Thus, the respondents' social and economic status reflects their financial situations one year after the pandemic outbreak, a critically important time.

We verified the construct validity of the questionnaire by drawing on existing approaches to measure financial literacy and resilience, and their underlying theory. First, the initial draft of the survey instrument mimicked the structure and flow of the OECD (2016b) toolkit for measuring financial literacy and used key questions previously included in the surveys conducted by Andreou and Philip (2018) and Andreou and Anyfantaki (2021).[4] This draft was then extensively discussed with an experienced scholar and the revised survey instrument was passed to IMR Cyprus, whereby its team of experts made further suggestions. Second, the final version of the survey instrument was piloted with 10 individuals through a telephone interview to check that it featured appropriate wording and tone, and logical question-flow. The latter also ensured that it was comprehensible and that respondents could provide their answers within a reasonable time window.[5] After the completion of the fieldwork, comparisons among key questions with prior surveys confirmed the reliability of our instrument.

The questionnaire is divided into four sections. The first section includes questions regarding sociodemographic information: *e.g.*, gender, residence, area (urban or rural), age, education level, current employment status, household size and annual gross income. This section also includes one further question inquiring relevance of studies to economics and/or finance on a scale ranging from 1 (no relevance) to 5 (high relevance).

The second section includes questions on financial knowledge based on questions that have been extensively used in prior surveys (*e.g.*, Lusardi and Mitchell, 2011; OECD, 2016b) and employed in studies investigating financial literacy in Cyprus (Andreou and Philip, 2018; Andreou and Anyfantaki, 2021). Table 1 lists the seven survey questions used to capture the financial knowledge of the respondents. These consist of (*i*) one recommended question as per the OECD (2016b) survey and similar to that of Lusardi and Mitchell (2011) that relates to the concept of "compound interest calculation" (Q1); (*ii*) three questions from Lusardi and Mitchell (2011) that relate to the concepts of "consequences of inflation" (Q2), "benefits of risk diversification" (Q3), and "understanding of inflation" (Q7); (*iii*) three questions following Andreou and Anyfantaki (2021) that relate to the concepts of "risk-return" (Q4), "understanding annual percentage rate" (Q5) and "awareness of crucial banking issues" (Q6).

Questions Q1, Q2 and Q3 were developed by Lusardi and Mitchell (2011)—known as the Big Three—and have been widely adopted in the U.S. and elsewhere. Although the Big Three generally do not demand advanced financial knowledge, only 34% of respondents in the survey presented in Lusardi and Mitchell (2011) were able to answer all three questions correctly. Individuals who fail to correctly answer Q1, Q2

[3] IMR Cyprus is one of the leading and most acclaimed market and survey research organizations in Cyprus with about 20 years of presence in the industry (www.imr.com.cy).

[4] The OECD (2016b) questions themselves are largely drawn from existing surveys and have all been validated and approved by OECD/INFE experts. They represent good practice in financial literacy and financial inclusion measurement. The questionnaire has been successfully used to capture the financial literacy of diverse populations and has been applied to more than 40 countries and economies which participated in an international survey of adult financial literacy competencies.

[5] Acknowledging the limitations of telephone surveys, this method has been extensively used in the literature for financial literacy (see, for example, Standard and Poor's Rating Services Global Financial Literacy Survey; Klapper, Lusardi, and Van Oudheusden 2015).

and Q7 will likely experience difficulties when facing even basic financial decisions characterized by an investment today and return in the future. Providing the correct answer to Q3 requires some knowledge about stocks and mutual funds as well as about the concept of risk diversification, and thus indicates if respondents can effectively manage their financial assets. The aim of survey questions Q4, Q5 and Q7 is to test public understanding of financial terms, in this case "risk-return", "annual percentage rate" (APR) and "inflation". These three questions, along with Q3, are more investment-specific questions in the sense that providing the correct answers to them requires some basic knowledge that people should have when engaging with professionals and taking investment decisions. Q6 is a banking specific question employed by Andreou and Anyfantaki (2021) to investigate the respondent's familiarity with the Deposit Guarantee Scheme, which emerged as a very important notion following the Cyprus bail-in of 2013.[6] Accordingly, the 7-question financial knowledge proficiency scale provides a richer set of information than other recent surveys by covering these additional topics and enhances our capacity to differentiate between financial literacy levels.

TABLE 1

Financial knowledge questions

No.	Question topic	Question wording	Answer options (correct answer with **bold**).
Q1	Compound interest calculation	Suppose you put €100 into a (no fee, tax-free) savings account with a guaranteed interest rate of 2% per year. You don't make any further payments into this account, and you don't withdraw any money. How much would be in the account at the end of five years?	Exactly €110 Less than €110 **More than €110** Exactly €102 Don't know/ Don't answer
Q2	Consequences of inflation	Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After one year, how much would you be able to buy with the money in the account?	More than today Exactly the same **Less than today** Don't Know/ Don't Answer
Q3	Benefits of risk diversification	Buying a stock of a single company is usually safer than buying a stock of a mutual fund.	True **False** Don't know/ Don't answer
Q4	Risk return	An investment with a high return is likely to be high risk	**True** False Don't know/ Don't answer
Q5	Understanding of APR	The Annual Percentage Rate (APR) is the appropriate tool to consider when assessing loans offered by different banks.	**True** False Don't know/ Don't answer
Q6	Awareness of	What is the deposit guarantee limit in	Open response

[6] The Deposit Guarantee and Resolution of Credit and Other Institutions Scheme (DGS) was established and has been operating since 2000. The primary purpose of the DGS is to compensate the depositors of covered institutions which pay contributions if a credit institution is unable to repay its deposits. The maximum amount of compensation, per depositor, per credit institution is €100.000, including accrued interest.

	crucial banking issues	Cyprus per depositor, per credit institution?	(**€100,000**) Don't know/ Don't answer
Q7	Understanding of inflation	High inflation means that the cost of living is increasing rapidly.	**True** False Don't know/ Don't answer

This table lists the survey questions to capture the financial knowledge of respondents. The second column lists the question topic, the third column provides the detailed wording of the question, and the fourth column lists the available answer options per question.

The third section of the questionnaire features the financial resilience/fragility questions. Our objective is to collect information about individuals' fragility position and to assess whether respondents who were more financially literate were better able to absorb financial setbacks during the COVID-19 period. First, we use an approach to financial fragility that is similar to that taken by Lusardi et al. (2011) and Clark et al. (2021): "*How confident are you that you could come up with €800, if an unexpected need arose within a month (i.e., without borrowing money or asking for help from a relative or a friend)?"*. Possible answers to this question are:

- *I am certain I could come up with €800,*
- *I could probably come up with €800,*
- *I could probably not come up with €800,*
- *I am certain I could not come up with €800,*
- *do not know*.

The question wording sought to measure peoples' capacity to manage a medium-size financial shock and, specifically, whether they could access resources in time of need. The amount of €800 measures whether households can face a shock equivalent to one month's income of those at the risk-of-poverty threshold.[7] Respondents who stated that they *certainly could not* or *probably could not* come up with €800 were classified as financially fragile, in other words these individuals lack financial resilience. This question has proven to be a very good indicator of respondents' financial situations, *i.e.*, whether they have liquid assets and their level of indebtedness (Gupta, Hasler, and Lusardi, 2018; Hasler and Lusardi, 2019).

The survey instrument also includes a measure of financial resilience in terms of availability of rainy-day funds at the time of interview. The 2015 OECD/INFE Toolkit for Measuring Financial Literacy and Financial Inclusion asks participants in surveys about the period they could sustain themselves in times of loss of their main income. Specifically, the surveys ask participants "*If you lost your main source of income today, how long could you continue to cover your living expenses, without borrowing any money or seeking help from a relative or friend?*". We allow for the following possible answers to this question:

- *less than a week*,

[7] This also follows the EU Statistics on Income and Living Conditions (EU-SILC) project, which carries out a yearly survey in which individuals are asked to assess their ability to face an unexpected expense. Specifically, the wording of the question is: "*Can your household afford an unexpected, required expense (amount to be filled) and pay through its own resources?"*. The survey uses 1/12th of the national at risk-of-poverty threshold of annual income per single consumption unit, in the year n-2 (2019 in our case). This means that it is independent of the size and structure of the individual household. See also Demertzis et al. (2020).

- *at least one week, but not one month,*
- *at least one month, but not three months,*
- *at least three months, but not six months,*
- *more than six months,*
- *I have no personal income/I receive financial support on a systematic basis,*
- *do not know.*

This question indicates availability of a financial cushion in case of loss of income (OECD, 2015b). Respondents who state that they could cover living expenses for less than a week or at least one week, but not one month or at least one month, but not three months and those who do not have personal income are classified as having no rainy funds available, thus showing low financial resilience.

The last section includes one multiple choice type question to identify the sources from which respondents seek financial advice. Recently, many studies have addressed the question whether financial advice may substitute for financial capabilities or these two should be considered as complements for improving consumer's financial decision-making. The literature has shown that financial advice is sought mostly by relatively knowledgeable investors (see, for example, Hackethal, Haliassos, and Jappelli, 2012) whilst less informed investors are more likely to invest without seeking advice (Collins, 2012). This section further asks respondents to indicate how much time they spend daily to get information about economic and financial issues as well as their awareness concerning retirement planning. Finally, a question on risk aversion captures an important trait that influences an individual's investment behavior. The behavioral characteristics identified in this last section are used as control variables in our regression analysis to distinguish the effect of financial literacy from other behavioral characteristics that might interplay individual's financial resilience.

2.2 Sample and respondent characteristics

The survey sample consisted of 840 Cypriot residents aged between 25 and 64 years old, who comprise the largest part of the working age population. The coverage number of 840 households is sufficiently large for the population characteristics of Cyprus.[8] To ensure a nationally representative sample, the survey data were collected from a stratified random sample of units that have been selected with known probabilities of selection from the population. No data weighting was applied in the reported analyses because the survey's sample is relatively well balanced in terms of gender and age composition. However, calibrated weights using predefined population marginals (strata, gender, age, education) are also calculated for robustness checks (not reported for brevity).[9] Admittedly, the weighted estimation of the main financial literacy and fragility measures differs only marginally from the unweighted one.

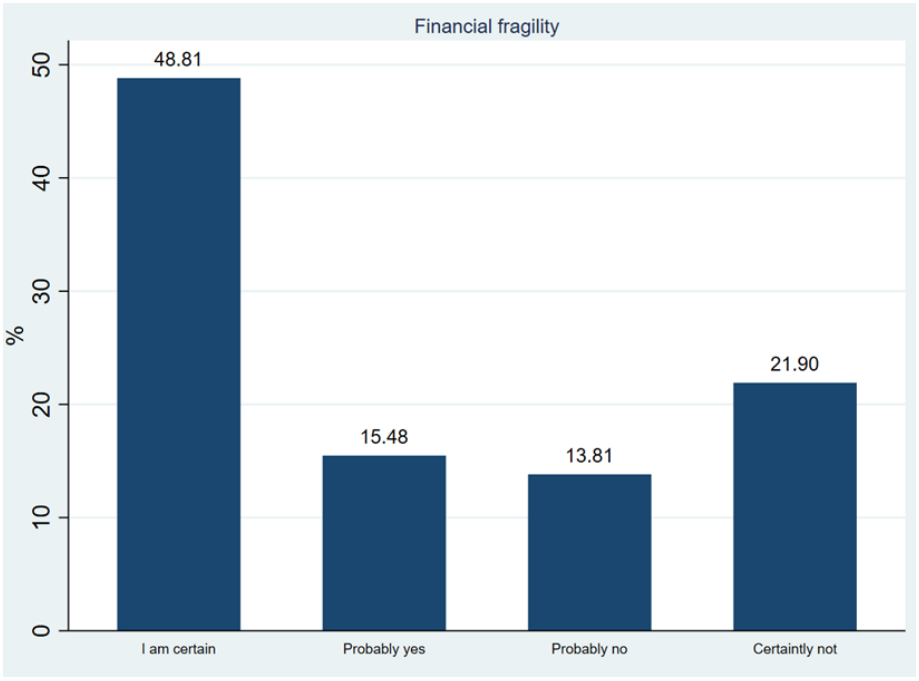
[8] The target of 840 individuals is also larger than the typical sample size of 600 individuals used for Cyprus in the EU Program of Business and Consumer Surveys (https://ec.europa.eu/info/business-economy-euro/indicators-statistics/economic-databases/business-and-consumer-surveys_en).

[9] The sample slightly under-represents individuals below 40 years, and it over-represents highly educated individuals.

As shown in Figure 1, 35.71% of respondents reported themselves to be financially fragile by declaring that *they could probably not come up* (13.81%) or are *certain that they could not come* (21.9%) with €800 to cover some unexpected expense. Table 2 presents statistics regarding the frequency and proportion of respondents' characteristics tabulated across non-fragile individuals, fragile individuals, and for the entire sample. The sample comprises 50.48% female participants and 49.52% male participants. About 338 survey participants (or 40.24% of the entire sample) live in Lefkosia, the capital of Cyprus, while a total of 567 (or 67.50% of the entire sample) live in an urban area. The majority of the participants hold a university degree (bachelor, master or higher) and of those, 23.33% state that their studies are extremely or very related to finance/economics.

FIGURE 1

Financial Fragility



Question: How confident are you that you could come up with €800, if an unexpected need arose within a month (*i.e.*, without borrowing money or asking for help from a relative or a friend)?

The statistics tabulated in Table 2 show that financial fragility falls as income increases but is still high for the middle-income households. Typically, middle-income households have assets, but they are often highly leveraged.[10] Possibly, debt and debt management, in addition to asset levels, affect ability to manage short-term shocks. About 23.10% of individuals aged between 18 and 39 are characterized as fragile compared with 12.62% aged between 50 and 64. Half of all financially fragile households have more than four members. Moreover, there is a significantly lower likelihood of being financially fragile with increasing education. Individuals with no economics-related studies are more likely to be fragile than individuals with studies

[10] According to the Eurosystem Household Finance and Consumption Survey (HFCS), both in 2015 and 2017 Cypriot households had the highest percentage of debt to GDP in the euro area. Moreover, the much higher debt service to income ratio of the average household in Cyprus is an indication of the increased debt repayment difficulty, with the problem being much more severe in the case of low-income households (Central Bank of Cyprus, 2019).

related to economics. Equivalently, those who do not follow the news are more likely to be fragile whilst increasing the time spent following news about financial/economic issues each day is associated with a reduction in the probability of being financially fragile.

TABLE 2

Respondent characteristics

	Non-fragile		Fragile		Entire sample	
	Frequency	%	Frequency	%	Frequency	%
A. Demographics						
1. Gender						
a) Male	264	31.43	152	18.10	416	49.52
b) Female	276	32.86	148	17.62	424	50.48
2. District						
a) Lefkosia	226	26.90	112	13.33	338	40.24
b) Lemesos	156	18.57	85	10.12	241	28.69
c) Larnaka	81	9.64	50	5.95	131	15.60
d) Ammochostos	24	2.86	22	2.62	46	5.48
e) Paphos	53	6.31	31	3.69	84	10.00
3. Area						
a) Urban	364	43.33	203	24.17	567	67.50
b) Rural	176	20.95	97	11.55	273	32.50
4. Years of age						
a) 18 to 29	59	7.02	117	13.93	176	20.95
b) 30 to 39	169	20.12	77	9.17	246	29.29
c) 40 to 49	130	15.48	44	5.24	174	20.71
d) 50 to 59	105	12.50	33	3.93	138	16.43
e) 60 to 64	77	9.17	29	3.45	106	12.62
5. Family Income						
a) Lower than 20,000 euro	151	17.98	149	17.74	300	35.71
b) 20,001 to 40,000 euro	216	25.71	92	10.95	308	36.67
c) 40,001 to 60,000 euro	129	15.36	31	3.69	160	19.05
d)More than 60,001 euro	36	4.29	8	0.95	44	5.24
e) Do not Answer	8	0.95	20	2.38	28	3.33
6. Household Size						
a) One	67	7.98	35	4.17	102	12.14
b) Two	109	12.98	53	6.31	162	19.29
c) Three	111	13.21	61	7.26	172	20.48
d) Four	166	19.76	94	11.19	260	30.95
e) Five to seven	86	10.24	57	6.79	143	17.02
f) Do not Answer	1	0.12	0	0	1	0.12
B. Education & Employment						
1. Level						
a) Higher (Bachelor or higher)	349	41.55	159	18.93	508	60.48
b) Middle (Secondary or Technical)	176	20.95	130	15.48	306	36.43
e) Lower	15	1.79	11	1.31	26	3.1
2.Finance and/or Economics Studies						
a) Not at all or slightly	275	32.74	209	24.88	484	57.62
b) Moderately	96	11.43	36	4.29	132	15.71
b) Extremely or Very	153	18.21	43	5.12	196	23.33
b) Do not answer	16	1.9	12	1.43	28	3.33
3. Employment status						
a)Self-	430	51.19	138	16.43	568	67.62

employed/employee						
b) Pensioner	49	5.83	11	1.31	60	7.14
c) Student	21	2.5	83	9.88	104	12.38
d) Not employed/ Other	40	4.76	68	8.1	108	40
D. Covid						
1. Income drop due to pandemic						
a) Tend to disagree	323	38.45	118	14.05	441	52.50
b) Neutral	81	9.64	57	6.79	138	16.43
c) Tend to agree	134	15.95	120	14.29	254	30.24
d) Do not answer	2	0.24	5	0.60	7	0.83
E. Other						
1. Source of financial advice						
a) Partner	57	6.79	11	1.31	68	8.10
b) Family or Friends	113	13.45	127	15.12	240	28.57
c) Professionals	100	11.91	40	4.76	140	16.67
d) Internet/Media	209	24.88	79	9.40	288	34.29
e) Other	53	6.31	31	3.69	84	10.00
f) Do not answer	8	0.95	12	1.43	20	2.38
2. Follow news activity (hours per day)						
a) Almost none	193	22.98	203	24.17	396	47.14
b) Less than half	194	23.1	74	8.81	268	31.9
c) Half to 1	125	14.88	19	2.26	144	17.14
d) 1 to 2	16	1.9	4	0.48	20	2.38
e) More than 2	8	0.95	0	0	8	0.95
f) Do not answer	4	0.48	0	0	4	0.48
3. Pension plan (aware)						
a) Not at all or little	210	25	206	24.53	416	49.53
b) To some extent	134	15.95	58	6.9	192	22.86
b) To a large extent or completely	196	23.33	36	4.29	232	27.62

This table reports summary statistics for the frequency and proportion of respondent characteristics tabulated across non-fragile individuals, fragile individuals and for the entire sample.

Finally, 15.95% of those identified as non-fragile have considered their pension plan to some extent, whilst 23.33% answer that they have considered their pension plan to a large extent or completely. Whilst we note that this evidence is a mere association, it suggests a positive relation between pension knowledge proficiency and financial resilience possibly because both require an individual to act proactively in terms of planning the future and be ready to handle income changes.

3. Financial knowledge proficiency and financial fragility

The main measure of financial knowledge (FK) we employ in this study is the average score of correct answers to the seven financial knowledge questions (Q1-Q7) of Table 1, namely FK 7. This 7-question scale represents a comprehensive measure of financial knowledge proficiency spanning concepts in the "saving, portfolio and mortgage" choice domain. For comparison, and to check whether there are any differential effects, we present results separately for FK 4, that is, the average score from the respondents' correct answers to questions Q1-Q4. This 4-question scale represents a measure of financial knowledge proficiency spanning concepts in the

"saving and portfolio" choice domain. In calculating the financial knowledge scales, each correct answer takes a score of one and any other response takes a score of zero (a similar approach has been followed, *inter alia*, in OECD, 2016b; Andreou and Philip, 2018; Andreou and Anyfantaki, 2021). The Appendix exhibits the definitions for the two financial knowledge measures along with other variables used in this study's analyses.

3.1 Univariate analysis

The breakdown of responses to the financial knowledge questions (frequency and proportion of correct, wrong, don't' know/don't answer replies) by non-fragile, fragile and the entire sample is reported in Table 3. Panel A shows that a large proportion of individuals correctly answered Q2 (*consequences of inflation*), Q4 (*risk-return*), and Q7 (*understanding of inflation*). More than half of the respondents (462 respondents or 55% of the entire sample) correctly answered the question on awareness of crucial banking services (Q6). Because employees and consumers around the world are being increasingly asked to select their pension investment portfolios, understanding risk diversification is critical. The percentage of correct answers to this question (Q3) is 46.67%. Similarly, the percentage of correct answers to the question on the compound interest rate question (Q1) is 45.24%. The composition of the annual percentage rate (Q5) and the understanding of the application of annual percentage rate (Q5) presented more of a challenge, as only 39.19% and 36.19% of respondents, respectively, could answer accurately. This evidence provides an indication of reliability in the FK 7 scale, as the distribution of correct answers seems to be balanced between its two composite measures, namely FK 4 and the rest of questions.[11]

Table 3, Panels B and C show the number of correct, wrong and don't know/ don't answer responses for Q1-Q4 (FK 4) and Q1-Q7 (FK 7). Over the entire sample, only 28 respondents (or 3.33% of the sample) answered all the questions (Q1-Q7) correctly. Our analysis shows that the individuals who answered Q1-Q4 correctly (96 individuals in total sample) are not the same individuals as those that answered Q5-Q7 correctly, *i.e.*, questions Q1-Q4 and Q5-Q7 capture different aspects of financial knowledge.[12] Relying to the 7-question financial knowledge scale, proficiency in financial knowledge is attributed to those answering at least five out of seven financial knowledge questions correctly.[13] Accordingly, as shown in Table 3 , Panel C 36.3% of Cypriots who responded to the survey appear to have a good level of financial knowledge and are thus perceived to be financially literate individuals. Consistent with the results in Andreou and Anyfantaki (2021), this aptitude score places Cyprus below the OECD (2016b) country average that stands at around 62% and are comparatively lower than those reported in similar studies from other countries as per the Standard and Poor's global financial literacy survey (Demirgüç-Kunt, Singer, and Van Oudheusden, 2015). The survey conducted in 2018 by the Central Bank of Cyprus also places Cyprus below the OECD average required

[11] Whilst the degree of financial knowledge proficiency as measured by FK 7 is clearly correlated to each of the seven questions forming the overall measure, the correlation between the seven questions is smaller (not reported for brevity).

[12] Given that the numbering of the questions here does not reflect the original numbering of the questions as they appear in the survey instrument, the above resembles a split-half reliability test where the sample is randomly split, and the scores are then calculated for each half.

[13] In the OECD (2016b) a minimum target score of at least five out of seven on the knowledge questions is employed, translating to a threshold of at least 70% of correct replies.

for an individual to be considered as financially knowledgeable. For completeness, in Table 3, Panel B we also assess the Cypriots' scores using the 4-question financial knowledge scale, whereby we attribute proficiency in financial knowledge to those answering at least three out of four financial knowledge questions correctly. Admittedly, the prior conclusion remains unchanged because in this case 37.62% are perceived to be financially literate individuals.

Fragile individuals scored lower in each of the seven financial knowledge questions. The difference is greater for the understanding of inflation question (Q7) to which fragile individuals are found to be approximately 30 percentage points less likely to answer correctly. This finding indicates that even though many Cypriots tend to understand what the definition of inflation is, not adequately comprehending its impact on the purchasing power might lead to being more exposed to shocks that could negatively affect individuals' future economic prosperity. Similarly, only approximately 16% of fragile individuals correctly answered the question on interest compounding. This gap in financial knowledge can lead to over-indebtedness or result in irresponsible use of credit. This finding, coupled with the fact that only 18.57% of fragile individuals understand the benefits of portfolio diversification (although with a smaller difference from the non-fragile individuals), means that individuals might not be able to make appropriate investment choices and might result in excessive risk taking. Finally, fragile individuals are about 27 percentage points less likely to correctly answer the question related to awareness of crucial banking issues and at the same time they are more likely to indicate that they don't know the answer.

TABLE 3

Patterns of responses to financial knowledge questions

	Non-fragile		Fragile		Entire sample	
	Frequency	%	Frequency	%	Frequency	%
Panel A: Distribution of answers						
Q1. Compound interest calculation						
Correct	246	29.29	134	15.95	380	45.24
Wrong	240	28.57	96	11.43	336	40.00
Don't Know / Don't Answer	54	6.43	70	8.33	124	14.76
Q2. Consequences of inflation						
Correct	343	40.83	137	16.31	480	57.14
Wrong	89	10.60	87	10.36	176	20.95
Don't Know / Don't Answer	104	12.86	76	9.05	184	21.91
Q3. Benefits of risk diversification						
Correct	236	28.10	156	18.57	392	46.67
Wrong	114	13.57	70	8.33	184	21.19
Don't Know / Don't Answer	190	22.62	74	8.81	264	31.43
Q4. Risk return						
Correct	378	45.00	158	18.81	536	63.81
Wrong	108	12.86	76	9.05	184	21.90
Don't Know / Don't Answer	54	6.43	66	7.86	120	14.29
Q5. Understanding of APR						
Correct	204	24.29	100	11.90	304	36.19
Wrong	98	11.67	62	7.38	160	19.05
Don't Know / Don't Answer	238	28.33	138	16.43	376	44.76

Q6. Awareness of crucial banking issues						
Correct	346	41.19	116	13.81	462	55.00
Wrong	62	7.38	30	3.57	92	10.95
Don't Know / Don't Answer	132	15.71	154	18.33	286	34.05
Q7. Understanding of inflation						
Correct	448	53.33	200	23.81	648	77.14
Wrong	52	6.19	52	6.19	104	12.38
Don't Know / Don't Answer	40	4.76	48	5.72	88	10.47
Panel B: Distribution of correct answers for financial knowledge questions Q1 to Q4						
No correct answers	36	4.29	40	4.76	76	9.05
One correct answer	94	11.19	58	6.90	152	18.09
Two correct answers	197	23.45	99	11.79	296	35.24
Three correct answers	137	16.31	83	9.88	220	26.19
All correct answers	76	9.05	20	2.38	96	11.43
Panel C: Distribution of correct answers for financial knowledge questions Q1 to Q7						
No correct answers	4	0.48	21	2.50	25	2.98
One correct answer	36	4.29	23	2.74	59	7.02
Two correct answers	33	3.93	31	3.69	64	7.62
Three correct answers	118	14.05	77	9.17	195	23.21
Four correct answers	127	15.12	65	7.74	192	22.86
Five correct answers	123	14.64	73	8.69	196	23.33
Six correct answers	71	8.45	10	1.19	81	9.64
All correct answers	28	3.33	0	0	28	3.33

This table presents the patterns of responses to the seven financial knowledge questions tabulated across non-fragile individuals, fragile individuals, and the entire sample. Table 1 details the context of each question.

Going forward, the upper part of Table 4 reports summary statistics for the financial knowledge proficiency variables (FK 4 and FK 7). The results show that Cypriots have average financial knowledge scores 0.532 and 0.545 for the two variables. Fragile respondents have lower mean values for FK 4 and FK 7 while the *t*-tests for mean differences show *p*-values<0.01, confirm other recent evidence of an inverse relation between financial literacy and financial fragility.

Table 4 also reports summary statistics for all variables used in the regression analysis over the entire sample, then for the subsample of non-fragile respondents and for the subsample of fragile respondents to provide evidence regarding which characteristics are associated with high levels of financial resilience.

Interestingly, there are fewer younger respondents (AGE) in the subsample of non-fragile respondents; the *t*-test has *p*-value<0.01. There is also a notable difference in financial fragility between low income and higher income individuals (LOW INCOME), whereby mean difference is statistically significant (*p*-value<0.01). The number of respondents with studies relevant to finance/economics (FINANCIAL STUDIES) and the number of respondents working full time (EMPLOYED) are statistically higher (*p*-values<0.01) in the financially resilient subsample, suggesting that education field and employment status play an important role for financial fragility. A steady job with stable income is a key component of managing household budgets, and it appears that financial resilience is unachievable without it for most working-age households. Not surprisingly, Table 4 also provides supporting evidence that individuals who had incurred a significant drop in their income because of the pandemic (INCOME SHOCK) appear to be more financially fragile

compared with their peers that have not suffered an income shock (p-value<0.01).

Regarding skills and traits that matter for financial fragility, the results show that the mean score for risk-taking (RISK TAKING) is higher for those individuals in the fragility sample, although non-significant. Furthermore, a higher proportion of respondents who rely on professional sources of information (ADVISE EXPERT) are in the non-fragile group, although the difference is marginally statistically significant between the two samples (p-value<0.10). The results of our study point to a weak univariate relation between financial fragility and the propensity to seek advice from professionals in Cyprus. However, the mean score for not following news regarding financial issues (IGNORE NEWS) is significantly higher in the financially fragile group (p-value<0.01). This is an indication that financially resilient individuals are more likely to follow the news every day. Finally, the number of respondents who have not considered pension planning is significantly higher in the fragile group (p-value<0.01).

TABLE 4

Summary statistics

	Obs.	Entire sample		Non-fragile		Fragile		t-test
		Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	
		(1)	(2)	(3)	(4)	(5)	(6)	
Financial knowledge proficiency								
FK 4	840	0.532	0.279	0.557	0.275	0.487	0.282	0.069***
FK 7	840	0.545	0.227	0.582	0.221	0.477	0.222	0.106***
Demographics								
GENDER	840	0.495	0.500	0.489	0.500	0.507	0.501	-0.018
AGE	840	2.705	1.310	2.948	1.231	2.267	1.335	0.681***
METROPOLITAN	840	0.402	0.491	0.419	0.494	0.373	0.484	0.045
URBAN	840	0.675	0.469	0.674	0.469	0.677	0.469	-0.003
LOW INCOME	812	0.369	0.483	0.284	0.451	0.5327	0.500	-0.248***
LARGE HOUSEHOLD	839	0.480	0.500	0.467	0.499	0.503	0.501	-0.036
LOW EDUCATION	840	0.031	0.173	0.028	0.164	0.037	0.188	-0.009
FINANCIAL STUDIES	812	0.241	0.428	0.292	0.455	0.149	0.357	0.143***
EMPLOYED	840	0.676	0.468	0.796	0.403	0.460	0.499	0.336***
Covid								
INCOME SHOCK	833	0.305	0.460	0.248	0.432	0.407	0.492	-0.158***
Skills and Traits								
RISK TAKING	834	1.816	0.847	1.835	0.848	1.784	0.844	0.051
ADVISE EXPERT	820	0.171	0.377	0.188	0.391	0.139	0.346	0.049*
IGNORE NEWS	836	0.474	0.500	0.360	0.480	0.677	0.469	-0.317***

PENSION UNAWARE	836	0.493	0.500	0.389	0.488	0.682	0.466	-0.294***

Summary statistics of the variables used in the regression analysis. Columns (1) and (2) report the mean and standard deviation (S.D.) of the variables for the entire sample. Columns (3) and (4) report the mean and standard deviation of the variables for the sample of respondents who are non-fragile. Columns (5) and (6) report the mean and standard deviation of the variables for the sample of respondents who are fragile. Column (7) reports *p*-values statistical significance resulting from *t*-tests that are testing the difference of means between columns (5) and (3), *i.e.*, mean difference between fragile vs non-fragile individuals. All the variables are defined in the Appendix. * denotes *p*-value< 0.10; ** denotes *p*-value< 0.05; *** denotes *p*-value< 0.01.

3.2 Multivariate analysis

To better identify the underlying factors associated with financial fragility, Table 5 reports logistic regression results. More precisely, the following logistic regression model is estimated:

$$\boldsymbol{Y_i = \alpha + \beta(FK_i) + \gamma_k Z_{ik} + \varepsilon_i,} \quad (1)$$

where the dependent variable Y_i is set equal to one when the respondent has answered "*Probably not*" or "*Certainly not*" to the question "*How confident are you that you could come up with €800, if an unexpected need arose within a month (i.e. without borrowing money or asking for help from a relative or a friend)?* ", and zero otherwise. The Appendix provides variable definitions and details of their calculation.

In *Eq*. (1) the variable FK_i denotes respondent's *i* financial knowledge proficiency as measured by FK 4 or FK 7, which is expected to be negatively related to financial fragility. Recently, Clark et al. (2021) report that in the U.S. about one in five respondents was financially fragile and would have difficulty facing a mid-size emergency expense, whilst more the financially literate were better able to handle such shocks. In a similar vein, Deevy et al. (2021) show that those who are financially literate are significantly more likely to be financially resilient, and this relation holds even when accounting for income and education.

As in prior studies, demographics that may influence the likelihood of financial fragility are included. More specifically, Lusardi et al. (2021) show that vulnerable groups are more at risk of being financially fragile; women are more likely than men to be financially fragile, those with less education and lower incomes are also at higher risk of being financially fragile. Moreover, Clark et al. (2021) show that financial fragility declines strongly with age, nonmarried individuals are more likely to be fragile compared to married individuals and people living in larger households are more fragile with each additional member increasing the likelihood of being fragile, while full-time employment status reduces the likelihood of being financially fragile.

Given the above, the vector of control variables Z_{ik} includes the baseline socio-demographics, *i.e*., gender (GENDER), age (AGE) and residence (METROPOLITAN and URBAN). At the same time, to gain more insights about the determinants of the likelihood of financial fragility, additional covariates (*i.e*., household size, education level and education field) are considered in more elaborated model specifications. A set of binary variables set equal to one (and zero otherwise) for full-time workers (EMPLOYED), for households with low income (LOW INCOME), for households with more than four members (LARGE HOUSEHOLD) and for those who had recently suffered a drop in income (INCOME SHOCK) are also included to capture the fact that some groups were more dis- advantaged at the outset of the pandemic.

Financial fragility could be associated with some measures of financial behavior, for

example the source of obtaining financial information. To take this into account, additional covariates were considered, particularly a binary variable indicating advice from professionals (ADVICE PROFESS) and indicating the respondent's apathy in following news daily (IGNORE NEWS). An individual's risk appetite (RISK TAKING) is also employed as one of the variables because it appears to play a role in portfolio choice and investment/saving decisions.

Models (1) and (3) in Table 5 present the baseline results with the 4- (FK 4) and 7-question (FK 7) financial knowledge scale, respectively. Regardless of which scale we use, the results show that being more financially knowledgeable lessens the chance of being financially fragile. Particularly, financial knowledge is one of the most significant and robust factors influencing the respondents' likelihood of being financially fragile. In other words, financially knowledgeable individuals have a higher propensity to be better prepared to meet unexpected expenses than their peers. The financial knowledge–fragility relation remains statistically significant when considering the more elaborate regression results in models (2) and (4), where in addition we control for sociodemographic characteristics including education and income.

Other factors that contribute to financial fragility are age, income, household size, education field, employment status, income shock because of the pandemic, following news activity and pension plan awareness. Particularly, models (1) and (3) of Table 5 indicate that age (AGE), as expected is negatively and statistically significant (p-values< 0.01) related to financial fragility (see, for example, Clark et al. 2021). On average, younger respondents are more fragile and this age effect remains strong even after controlling for the larger set of variables in models (2) and (4). Low resilience among the young is expected but can be problematic since this group faces financial decisions that influence their financial wellbeing for decades to come. Individuals with studies more relevant to finance/economics (FINANCIAL STUDIES) are less likely to be financially fragile, most likely because they are more likely to better understand and be more aware of economic and financial concepts, and hence have a higher level of financial literacy and precautionary behavior. The finding is consistent with existing literature, which outlines that education is one of the most important factors in ensuring adequate levels of understanding of financial concepts.

Having a low income (LOW INCOME) and belonging to a household with more than four members (LARGE HOUSEHOLD) also play a significant role (p-value< 0.01) in explaining financial resilience. Households with more members (typically children) are more likely to be financially fragile since income has to cover higher variable costs such as housing and food, and financial obligations are often also higher (including, for example, childcare costs and education or extra-curricular activities). Low-income households are more likely to be financially fragile. This income group has been hit the hardest by the COVID-19 crisis.

The results in models (2) and (4) show that those who are full-time employed (EMPLOYED) tend to have a lower probability of being financially fragile (p-values< 0.01). This is not surprising and may be further explained by the fact that these individuals received state benefits during the pandemic. The opposite holds true for those that suffered a significant income drop due to the pandemic outbreak (INCOME SHOCK). In terms of evaluating the importance of respondents' soft skills and traits, the results show that individuals who consider themselves as risk takers when it comes to financial decisions (RISK TAKING) have a higher likelihood of

being financially fragile. Results do not support that there is a statistically significant relation between seeking financial advice from professionals (ADVICE EXPERT) and financial fragility. However, following the news every day and having thought about a pension plan an important role in explaining financial fragility. The finding about pension planning is even more important taking into consideration the negative relation between age and financial fragility. Financial literacy is also correlated with planning for the future, as the financially literate are more likely to save and plan for retirement (Lusardi et al., 2021).

TABLE 5

Determinants of financial fragility

	(1)	(2)	(3)	(4)
FK 4	-0.994***	-0.648*		
	(0.267)	(0.355)		
FK 7			-2.224***	-0.819*
			(0.331)	(0.432)
GENDER	0.126	0.261	0.114	0.246
	(0.152)	(0.194)	(0.155)	(0.195)
AGE	-0.442***	-0.486***	-0.448***	-0.486***
	(0.066)	(0.076)	(0.067)	(0.076)
METROPOLITAN	-0.177	-0.246	-0.189	-0.252
	(0.153)	(0.196)	(0.156)	(0.196)
URBAN	0.086	0.173	0.080	0.168
	(0.161)	(0.209)	(0.165)	(0.210)
LOW INCOME		0.732***		0.725***
		(0.202)		(0.205)
LARGE HOUSEHOLD		-0.537***		-0.537***
		(0.199)		(0.198)
LOW EDUCATION		0.140		0.115
		(0.456)		(0.458)
FINANCIAL STUDIES		-0.738**		-0.726**
		(0.287)		(0.286)
EMPLOYED		-1.417***		-1.406***
		(0.208)		(0.209)
INCOME SHOCK		1.155***		1.144***
		(0.236)		(0.236)
RISK TAKING		-0.119		-0.102
		(0.120)		(0.120)
ADVICE EXPERT		-0.113		-0.124
		(0.290)		(0.286)
IGNORE NEWS		0.896***		0.863***
		(0.202)		(0.208)
PENSION UNAWARE		1.068***		1.038***
		(0.195)		(0.193)
Number of observations	840	757	840	757
Pseudo R-squared	0.064	0.285	0.091	0.285
Chi-squared	57.528	186.965	85.677	189.805
Log Likelihood	-512.361	-343.408	-497.623	-343.367

Logistic regression estimates of the factors influencing respondents' financial fragility. The dependent variable is set equal to one when the respondent has answered "*Probably not*" or "*Certainly not*" to the question "*How confident are you that you could come up with €800, if an unexpected need arose within a month*

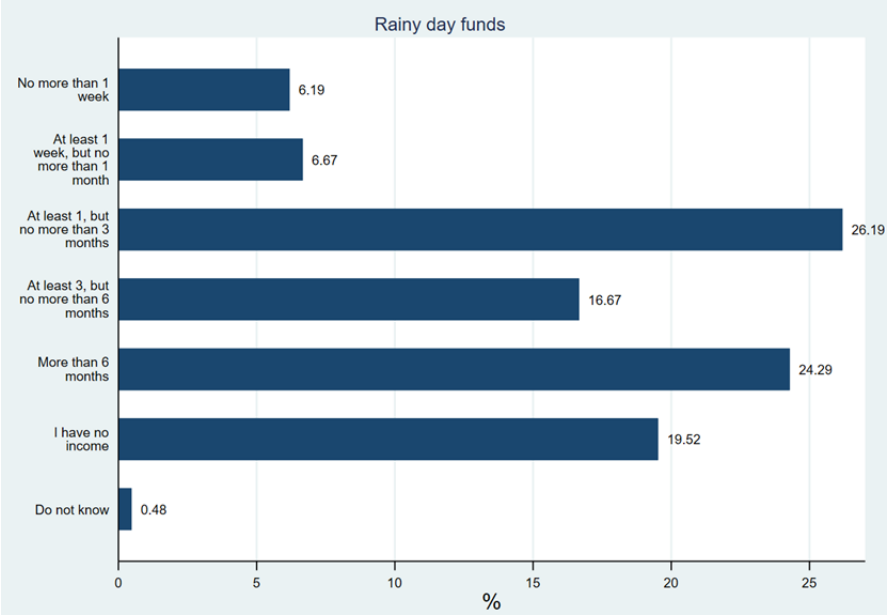
(i.e. without borrowing money or asking for help from a relative or a friend)?", and zero otherwise. For variable definitions and details of their calculation, see the Appendix. The estimates include a constant whose coefficient is suppressed. Huber-White robust standard errors are displayed in parentheses. * denotes *p*-value< 0.10; ** denotes *p*–value< 0.05; *** denotes *p*-value< 0.01.

4. Rainy-day funds

Numerous studies have noted a strong link between financial knowledge and behavior (Lusardi and Mitchell, 2011; Robb and Woodyard, 2011). Robb and Woodyard (2011) highlighted that engaging in responsible financial behaviors (including possession of emergency funds) was positively associated with financial knowledge.

Figure 2 shows that around 40% of individuals can cover their living expenses for at least 3 months following an unexpected loss of their main source of income. Table 6 provides complementary evidence that financial knowledge proficiency is indeed associated with low levels of rainy-day funds. The results suggest that individuals who have a higher financial knowledge score, irrespective of the scale used, have a statistically higher likelihood of being able to cover their living expenses for more than 3 months in case of an income loss, *i.e.*, the availability of a financial cushion in case of loss of income is more likely.

FIGURE 2
Rainy day funds



Question: If you lost your main source of income today, how long could you continue to cover your living expenses, without borrowing any money or seeking help from a relative or friend?

The results in Table 6 corroborate the findings of the survey of Central Bank of Cyprus which suggest that individuals who can cover their living expenses for more than 6 months have higher mean financial knowledge score than individuals with the capacity to cover their living expenses between one week and less than 6 months. Hence, two independent surveys have shown that financial knowledge is associated with financial fragility, proxied by an individual's ability to cope with an unexpected

loss of the main income source without borrowing money or moving house.

TABLE 6
Determinants of low levels of rainy-day funds

	(1)	(2)	(3)	(4)
FK 4	-1.735***	-1.837***		
	(0.264)	(0.351)		
FK 7			-2.916***	-2.683***
			(0.357)	(0.422)
GENDER	-0.013	0.181	-0.051	0.127
	(0.150)	(0.180)	(0.152)	(0.180)
AGE	-0.415***	-0.272***	-0.420***	-0.283***
	(0.056)	(0.080)	(0.058)	(0.081)
METROPOLITAN	-0.151	-0.122	-0.160	-0.144
	(0.151)	(0.181)	(0.154)	(0.182)
URBAN	0.002	0.096	-0.002	0.086
	(0.162)	(0.195)	(0.167)	(0.197)
LOW INCOME		0.897***		0.866***
		(0.205)		(0.205)
LARGE HOUSEHOLD		0.315*		0.293
		(0.179)		(0.180)
LOW EDUCATION		0.009		-0.076
		(0.561)		(0.563)
FINANCIAL STUDIES		0.290		0.347
		(0.224)		(0.223)
EMPLOYED		-1.078***		-1.070***
		(0.217)		(0.222)
INCOME SHOCK		0.312		0.283
		(0.213)		(0.215)
RISK TAKING		0.238**		0.293***
		(0.111)		(0.111)
ADVICE EXPERT		-0.993***		-1.074***
		(0.253)		(0.253)
IGNORE NEWS		0.899***		0.807***
		(0.192)		(0.193)
PENSION UNAWARE		0.864***		0.779***
		(0.186)		(0.184)
Number of observations	836	753	836	753
Pseudo R-squared	0.082	0.235	0.107	0.243
Chi-squared	91.816	187.547	104.246	184.850
Log Likelihood	-519.632	-393.889	-505.632	-389.670

Logistic regression estimated of the factors influencing respondents' availability of rainy-day funds. The dependent variable is set equal to one when the respondent has answered "*Less than a week*" or "*At least one week, but not one month*" or "*At least one month, but not three months*" or "*I have no personal income /I receive financial support on a systematic basis*" to the question "*If you lost your main source of income today, how long could you continue to cover your living expenses, without borrowing any money or seeking help from a relative or friend?*", and zero otherwise. For variable definitions and details of their calculation, see the Appendix. The estimates include a constant whose coefficient is suppressed. Huber-White robust standard errors are displayed in parentheses. * denotes *p*-value< 0.10; ** denotes *p*–value< 0.05; *** denotes *p*-value< 0.01.

Control variables included in all models are the same as the ones in Table 5. The regression analysis results are according to expectations. For example, availability of a financial cushion declines strongly with age (*p*-value< 0.01). Controlling for key

economic and demographic variables, older people are significantly less likely to have low levels of rainy-day funds than the youngest age group in our sample. At the same time, the likelihood of having emergency funds is higher for respondents who work full-time than those out of work and the same holds for individuals with studies more relevant to finance/economics. Also, high income has a positive effect on the likelihood of holding emergency savings. Finally, daily activity concerning following the news plays a role in saving for rainy days. However, interestingly now the source of financial advice turns out to be significant (p-value< 0.01), meaning that taking advice from professionals increases the likelihood of holding emergency funds, other things being equal.

5. Conclusions and policy suggestions

Our study presents compelling empirical evidence indicating that individuals in Cyprus exhibit varying degrees of financial fragility. Notably, fragility is lower amongst those with higher levels of financial knowledge proficiency, people who studied courses related to economics, and those who follow news stories covering financial and economic issues. In other words, there is evidence to suggest that people in Cyprus who are financially literate, educated in economic matters and alert to recent financial and economic trends are more likely than their peers to be financially resilient.

Higher levels of fragility are also found amongst people who suffered an income drop in the COVID-19 pandemic period, highlighting how easy it is for a household to move into a position of fragility when their income changes, a finding that is consistent with various other studies around the world (Howes, Monk-Winstanley, Sefton, and Woudhuysen, 2020; Ampudia, Van Vlokhoven, and Zochowski, 2016). Regular, predictable levels of income are an important component of financial resilience. Income can be protected to some extent by workplace provisions such as sick pay and parental leave, as well as by government transfers such as the furlough payments favored during COVID-19 and private insurance policies designed to protect income in general or safeguard the ability to repay priority credit commitments such as mortgages. However, our findings show that fluctuations left individuals and households increasingly vulnerable.

Detailed analyses of the characteristics of those people who are most resilient has identified some interesting patterns that can help to create policy interventions designed to increase resilience across the population and maintain it even in times of difficulty. Whilst people with higher levels of education and income were in a better position than others to weather the adverse effects of the pandemic, this is not the whole story. We identify an additional benefit from having higher levels of financial knowledge. Our findings show that even when someone has the money to be able to build a rainy-day fund, they are less likely to do so if they do not understand the basic concepts around saving, investing, and borrowing. This could be because they fail to see the potential benefit of creating such a fund, or because they know that they would benefit from saving but do not know how to do so. It could also result from a lack of confidence to choose financial products, or because of prior mistakes that have reduced the money available to save. Research in other countries has also identified this specific benefit from financial knowledge (see, for example, Bialowolski, Cwynar, and Weziak-Bialowolska 2022; Borrescio-Higa, Droller, and Valenzuela, 2022; Kim, Lee, and DeVaney, 2022).

While it is of significant concern that so few people in Cyprus have high levels of financial knowledge proficiency, it is possible to address this problem by providing access to high-quality financial education. And it can be valuable to do so! Various studies have shown that people who receive good quality financial education are more likely than those who have not received such education to start to save and plan for the future (Bernheim, Garrett, and Maki, 2001; Lusardi, 2009; Cole, Sampson, and Zia, 2010; Angelici, Del Boca, Oggero, Profeta, Rossi, and Villosio, 2022), and a recent meta-analysis has confirmed that well designed financial education can be effective (Kaiser, Lusardi, Menkhoff, and Urban, 2022). Consequently, there is now a large body of guidance aimed at financial policy makers, recommending that they provide financial education to improve financial literacy (Gradstein, Abbas, and Tomilova, 2021; OECD, 2020c). Such recommendations typically suggest developing a nationally coordinated strategy that brings together all the key stakeholders to reach the whole population. As the OECD legal instrument on financial literacy recommends, ideally, such education will begin at a young age, to shape positive habits and behaviors and impart sound financial knowledge and skills before they are needed (OECD, 2020c). Our results illustrate that the young people of Cyprus need such education to build their resilience and prevent future financial fragility.

Given this, it is reassuring that Cyprus has recently launched its first National Strategy for the Promotion of Financial Literacy and Education. This strategy applies good practices and guidance from respected international organizations including the OECD. It is based on the understanding that financial education can be used to help people to manage their money more effectively through a variety of initiatives designed to improve knowledge and encourage attitude and behavior change where required. It will also signpost people to professional support when required.

Our findings highlight the difficulties faced by young adults, and the national strategy recognizes that providing financial education to younger groups can be an efficient way to build the resilience of a large proportion of the population in Cyprus. Young people in school, college or university are likely to be more receptive to learning about financial matters within their educational environment than they would be elsewhere, and educators are already familiar with the youth that they serve, making it easier for them to integrate relevant financial education into their classes. And, as the American Sociologist Edward Burghardt Du Bois said: "*Education must not simply teach work — it must teach life*".

Research has also shown that youth financial education can have positive spillover effects on family members in some circumstances (see, for example, Maldonado, De Witte, and Declercq, 2022). When young people become more confident talking about money and making financial decisions, they are likely to spread the word to friends and family (see, for example, Kallenos, Milidonis, Nishiotis, and Zenios, 2022), and they may also be able to support seniors who are struggling in the increasingly digital financial landscape. They may also become proactive consumers, demanding better services and new products from financial providers.

Providing financial education to children and young adults is invaluable, but older adults would also benefit from opportunities to improve their financial literacy. Evidence shows that education can complement social security nets and emergency provision by empowering adults to identify ways to make difficult decisions in the short term and start to build a savings fund as soon as things change for the better (Kaiser et al., 2022).

Such education needs to be made available for the long term and should be developed to be responsive to changing trends. New groups may become vulnerable as the cost-of-living crisis continues, and people may move in and out of vulnerability as their circumstances change, requiring different levels of support and education. Furthermore, as the financial landscape evolves and the economic climate changes, the content of financial education initiatives will also need to be revised. For example, until recently younger adults have lived through a period of relatively stable and low inflation and interest rates and may not have the knowledge and skills to consider high inflation or fluctuating interest rates in their budgeting calculations.

It is imperative to continue to monitor financial fragility, financial knowledge and the broader range of behaviors, skills and attitudes that make up financial literacy in the coming years, both to measure improvements and to identify remaining vulnerable groups that may require different types of interventions. Countries with a national strategy typically undertake such surveys once every 3 to 5 years (OECD, 2015a). In Cyprus, more regular monitoring may be required in the short term, given the high levels of fragility and uncertainties created by the rising cost of living. This will also provide valuable evidence in the early stages of the strategy, allowing for rapid responses to any issues identified.

Building rainy-day funds will become more challenging as the cost-of-living increases, and at the same time the purchasing power of savings is reducing since interest rates are not keeping pace with inflation. It is therefore increasingly urgent that policies are put in place to maximize the value of money set aside for emergencies and motivate savings behavior. Suggestions such as prize-based savings schemes, tax incentives or matched-contributions could be considered as ways to support savings amongst those most vulnerable to financial hardship and more resilient adults could be encouraged to consider appropriate investment strategies given their age and risk profile.

The role of credit should also be researched in more detail and addressed in policies designed to improve financial resilience. Cyprus faces high levels of non-performing loans, some of which predate regulatory changes. But on top of this, we see that many people turn to borrowing when faced with financial shocks, and this tendency, combined with new forms of borrowing such as Buy Now, Pay Later (BNPL) may increase the risk of households falling into a cycle of debt.

Falling victim to financial scams and fraud can also lead to financial fragility, as well as potentially reducing trust in financial service providers. This is another area where broad supply side approaches—such as those designed to identify and prevent illegal activities—can be combined with extensive consumer information campaigns and guidance to help individuals to steer clear of danger (DeLiema, Li, and Mottola, 2022).

Finally, there is evidence indicating that individuals with low financial knowledge proficiency in Cyprus tend to express, more frequently than their financially literate counterparts, a lack of trust in electronic banking services; additionally, they often cite a lack of self-confidence in financial and digital skills as the primary reasons for not engaging with these services (Andreou and Anyfantaki, 2020). Therefore, there is a pressing need to advocate for initiatives that elevate digital financial literacy levels. This would empower individuals to make well-informed decisions, prevent irresponsible financial behavior, and enhance their ability to assess the risks and

benefits associated with financial products and services offered through technology. Consequently, policy interventions aimed at improving individuals' digital financial literacy could play a crucial role in ensuring financial and economic stability. These interventions may also help mitigate the risks and impact of future financial crises by enhancing households' resilience to shocks.

In summary, whilst our results point to reasons to be concerned about the levels of financial fragility in Cyprus, there are also many reasons for hope. Our findings suggest that significant improvements can be made, *inter alia*, through improved access to high quality financial education. Resilience cannot be created overnight, but the policy environment can improve knowledge and support positive behaviors, leading to significant improvements in the future. Regular data collection will allow us to monitor progress and make further recommendations aimed at achieving this goal.

Appendix

Variable Definitions

Variable name	Variable description
Financial knowledge	
FK 4	The average score of a respondent's answer in financial knowledge questions Q1, Q2, Q3 and Q4 of Table 1, whereby each correct answer takes a score of one, whilst all other answers take a score of zero.
FK 7	The average score of a respondent's answer in financial knowledge questions Q1 to Q7 of Table 1, whereby each correct answer takes a score of one, whilst all other answers take a score of zero.
Demographics	
GENDER	One if male, and zero if female.
AGE	One if respondent's age is between 18-29, two if it is between 30-39, three if it is between 40-49, four if it is between 50-59, and six if it is between 60-64.
METROPOLITAN	One if the respondent lives in the capital (Lefkosia), and zero otherwise.
URBAN	One if the respondent lives in an urban area, and zero otherwise.
LOW INCOME	One if the respondent's annual income is €20,000 or less, and zero otherwise.
LARGE HOUSEHOLD	One if the respondent's household has four members or more, and zero otherwise.
LOW EDUCATION	One if the respondent's education is lower than secondary level, and zero otherwise.
FINANCIAL STUDIES	One if the respondent's studies are extremely or very relevant to economics and/or finance, and zero otherwise.
EMPLOYED	One if the respondent is self-employed or employee, and zero otherwise.
Covid	
INCOME SHOCK	One if the respondent (self-reports) that their income dropped significantly after the pandemic outbreak, and zero otherwise.
Skills and traits	
RISK TAKING#	Score for risk-taking attitude (tendency to take risks).
ADVICE EXPERT	One if the respondent seeks financial advice from

	professionals, and zero otherwise.
IGNORE NEWS	One if the respondent doesn't follow news about economic and financial issues, and zero otherwise.
PENSION UNAWARE	One if the respondent is unaware or slightly aware about retirement planning, and zero otherwise.

Notes:

[#] On a scale of 1 to 5, where 1 means *totally disagree* and 5 means *totally agree*, to what extent do you agree or disagree with the following statement: "*I take risks when it comes to my financial decisions*".

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