Department of Economics and Statistics "Cognetti de Martiis"
Campus Luigi Einaudi, Lungo Dora Siena 100/A, 10153 Torino (Italy)
www.est.unito.it

Working Paper Series

20/21

DIGITAL AND FINANCIAL LITERACY AS DETERMINANTS OF DIGITAL PAYMENTS AND PERSONAL FINANCE

ANNA LO PRETE

The Department of Economics and Statistics "Cognetti de Martiis" publishes research papers authored by members and guests of the Department and of its research centers. ISSN: 2039-4004

Digital and financial literacy as determinants of digital payments and personal finance

Anna LO PRETE *

This draft: October 2021 **

Abstract

This work documents that, across countries, the use of digital payment tools and platforms is associated to higher digital literacy, at all levels of financial literacy. More informed personal finance choices, instead, are associated to higher financial literacy, at all levels of digital literacy. The results from this preliminary analysis suggest that digital and financial literacy should be considered together when assessing the implication of digitalization for individual investors, who can access digital financial products and markets in the absence of financial literacy.

Keywords: digitalization; digital literacy; financial literacy; digital payments; personal finance.

JEL Classification: D53, G11, G53, O16.

* University of Torino, Department of Economics and Statistics, and CeRP. Email: anna.loprete@unito.it.
** I would like to thank seminar participants at the 8th STS Italia Conference, Giuseppe Bertola, and Maela Giofré for useful comments. The usual disclaimer applies.

1. Introduction

In modern economies, the use of software applications through personal digital devices, such as smartphones and tablets, to access financial services and products, the so-called *fintech*, has offered new investment opportunities as well as risks for individual investors in direct control of their personal finance. This paper is motivated by the idea that people need both *digital literacy* - proficiency in the use of digital platforms and applications - and *financial literacy* - the ability to understand the basics of economics and finance to take personal finance decisions – to share the benefits of the digitalization of banking and financial markets.

From the literature, we know that digital literacy is associated with better labor market outcomes, depends on education attainment, is related to individual socio-economic backgrounds (OECD, 2019), and fosters, along with financial literacy, entrepreneurship (Oggero et al., 2020). Financial literacy relates to various aspects of individual decision-making over the life-cycle, inequality, electoral participation, policy outcomes (see the review of the literature by Fornero et al., 2021). It is also associated to larger financial assets' holdings (Lusardi and Mitchell, 2014), to a smaller use of cash in Canada and Poland (Henry et al., 2018; Swiecka et al., 2021), to larger cash holdings in Japan (Fujiki, 2020).

This work analyses how the use of digital payments and personal finance choices is associated to digital and financial literacy, first in models that account for one indicator at a time, then, in models that include both. The skills needed to use digital technologies and the skills needed to operate on financial markets are positively associated across countries, and each is associated to a higher use of digital payments and to more informed personal finance choices. However, to study the determinants of investors behavior, it is important to control for both. In the data, such empirical exercise shows that the use of digital payment tools and platforms is mainly driven by the ability to use digital technologies, while personal finance choices are mainly driven by financial literacy.

The paper proceeds as follows. Section 2 describes the indicators used to measure digital literacy and financial literacy. Section 3 explores the determinants of digital payments and personal finance. Section 4 concludes discussing policy implications.

2. Digital and financial literacy

The Survey of Adult Skills, developed as part of the OECD Programme for the International Assessment of Adult Competencies (PIAAC), includes a proxy of digital literacy: *proficiency in problem solving in a technology-rich environment*. This indicator measures the level of skills needed to use digital technology, communication tools and networks to acquire and evaluate information, communicate with others, and perform practical tasks (OECD, 2019). Adults (15-65 years old) are

digitally literate if they are, at least, able to use ICT tools and applications for achieving a goal (e.g. to fill in an online form).[1]

In figure 1, the percentage of the population considered digitally literate is plotted against the percentage of the population considered financially literate. Financial literacy is measured using the indicator compiled by the 2014 Standard & Poor's Ratings Services Global Financial Literacy Survey: a person is financially literate if she answers correctly to three out of four questions over the concepts of numeracy, interest compounding, inflation, and risk diversification. The positive slope of the regression line in figure 1 (correlation coeff. = 0.59, std. error = 0.11) indicates that financial literacy is significantly higher in countries where a higher proportion of the population is able to use digital technologies and applications to perform basic information-processing tasks.

Countries differ along these two dimensions. On average, the percentage of the population who masters digital technologies (31%) is much lower than the percentage of financially literate people (55%). Financial and digital literacy are higher in the Nordic countries and in the Netherlands; lower in Eastern European countries, Turkey, Chile, and Greece. In economies where the high-tech sector played an historically relevant role, such as South Korea and Japan, people score much higher in digital literacy than in financial literacy. Thus cross-country heterogeneity in the variation of digital and financial literacy allows to discuss which skills are relevant to households' use of digital payments and personal finance management.

3. Digital payments and personal finance

Data on digital payments are from the Global Financial Inclusion Database by the World Bank (Demirguc-Kunt et al., 2018). The variable "digital payments" measures the percentage of the population (aged 15+ years old) who made digital payments, payed bills, sent remittances, or bought something in the past year, using mobile phones, cards, or the internet. Data on personal finance are indicators from the OECD Household financial assets online database (OECD, 2021) which measure, as a percentage of total household financial assets, the amount of "currency and deposits" and of "pension fund assets" hold by households (descriptive statistics are in Table 1).

The results in Table 2 indicate that, when considered separately, both digital literacy (in column 1) and financial literacy (in column 2) are associated to a higher use of digital payments, in empirical models that control for a set of standard socio-economic determinants, where all regressors are averages over the sample period. The variation in the right-hand side variables might be exogenous: then, in regressions that control for both digital and financial literacy, the use of digital payments

[1] The PIAAC survey was administered in three non-overlapping rounds. This study considers the 25 OECD countries for which data on digital literacy, financial literacy, and digital payments are available.

methods through the internet is higher in countries with higher levels of digital literacy and GDP per capita, but is not associated to a higher knowledge of basic economics and finance in column 3 and in regressions including the interaction term between digital and financial literacy (in column 4).

Table 3 considers the determinants of more informed personal finance choices - i.e. to less currency and deposits holdings and larger investments in funds that provide retirement income. Currency and deposits holdings are lower in countries with higher levels of digital literacy (in column 1), except in regressions that include also financial literacy. In columns 2 and 3, there is a negative and significant association between currency and deposits and financially literacy, at all levels of digital literacy. A similar message is conveyed by the results on pension funds assets' holdings: households hold larger amounts of assets helping them to save income for retirement in countries with higher levels of financial literacy, and with larger population, at all levels of digital literacy (columns from 5 to 8).

4. Concluding remarks

The results in this work suggest that digital literacy is not associated to personal finance, in digital economies where financial products and payment methods are easily available to those who have a basic understanding of digital technologies, and may lack some basic knowledge of economics and finance. While in future work their robustness should be tested to address endogeneity and consider more dimensions of digital payments and personal finance, this empirical analysis could motivate future research on a currently policy relevant topic: the potential danger of increasing digital literacy in the absence of financial literacy.

The OECD has recently acknowledged that policy-makers are facing the difficult task to make the digital transformations they foster, benefit and increase the social well-being of the society as a whole, and has started discussing the relevance of the multifaced concept of *digital financial literacy*. A standardized definition and indicators being yet missing, it basically refers to developing financial education contents and competences specifically targeted to face the challenges and risks created by financial products' digitalization (OECD, 2018).

The present analysis supports the idea that policies aiming at providing real access to online information and services without leaving the most fragile segments of the society behind, should be accompanied by investments in educational programs targeted at developing financial literacy and, hence, at helping people manage digital financial products.

References

Demirguc-Kunt, A., Klapper, L., Singer, D., Ansar, S., Hess, J. (2018). Global Findex Database 2017: Measuring Financial Inclusion and the Fintech Revolution. Washington, DC: World Bank.

Fornero, E., Lo Prete, A., Oggero, N. (in press). Now more than ever: Why financial literacy is a key element of post-COVID-19 recovery. In B. J Cude & G. Nicolini (Eds.), Handbook on financial literacy. Routledge.

Fujiki, H. (2020). The use of noncash payment methods for regular payments and the household demand for cash: evidence from Japan. The Japanese Economic Review 71: 719–765.

Henry, C.S., Huynh, K.P., Welte, A. (2018). 2017 Method-of-Payments Survey Results. Bank of Canada Staff Discussion Paper 2018-17.

Lusardi, A., Mitchell, O.S. (2014). The economic importance of financial literacy: theory and evidence, Journal of Economic Literature 52 (1): 5-44.

Oggero, N., Rossi, M.C., Ughetto, E. (2020). Entrepreneurial spirits in women and men. The role of financial literacy and digital skills. Small Business Economics 55: 313–327.

Swiecka, B., Terefenko, P., Wisniewski, T., Xiao, J. (2021). Consumer Financial Knowledge and Cashless Payment Behavior for Sustainable Development in Poland. Sustainability 13: 1-18.

OECD (2021). Household financial assets (online database).

OECD (2019). Skills Matter: Additional Results from the Survey of Adult Skills, OECD Skills Studies, OECD Publishing, Paris.

OECD (2018). G20/OECD INFE Policy Guidance on Digitalisation and Financial Literacy, OECD Publishing, Paris.

Figure 1. Digital and financial literacy.

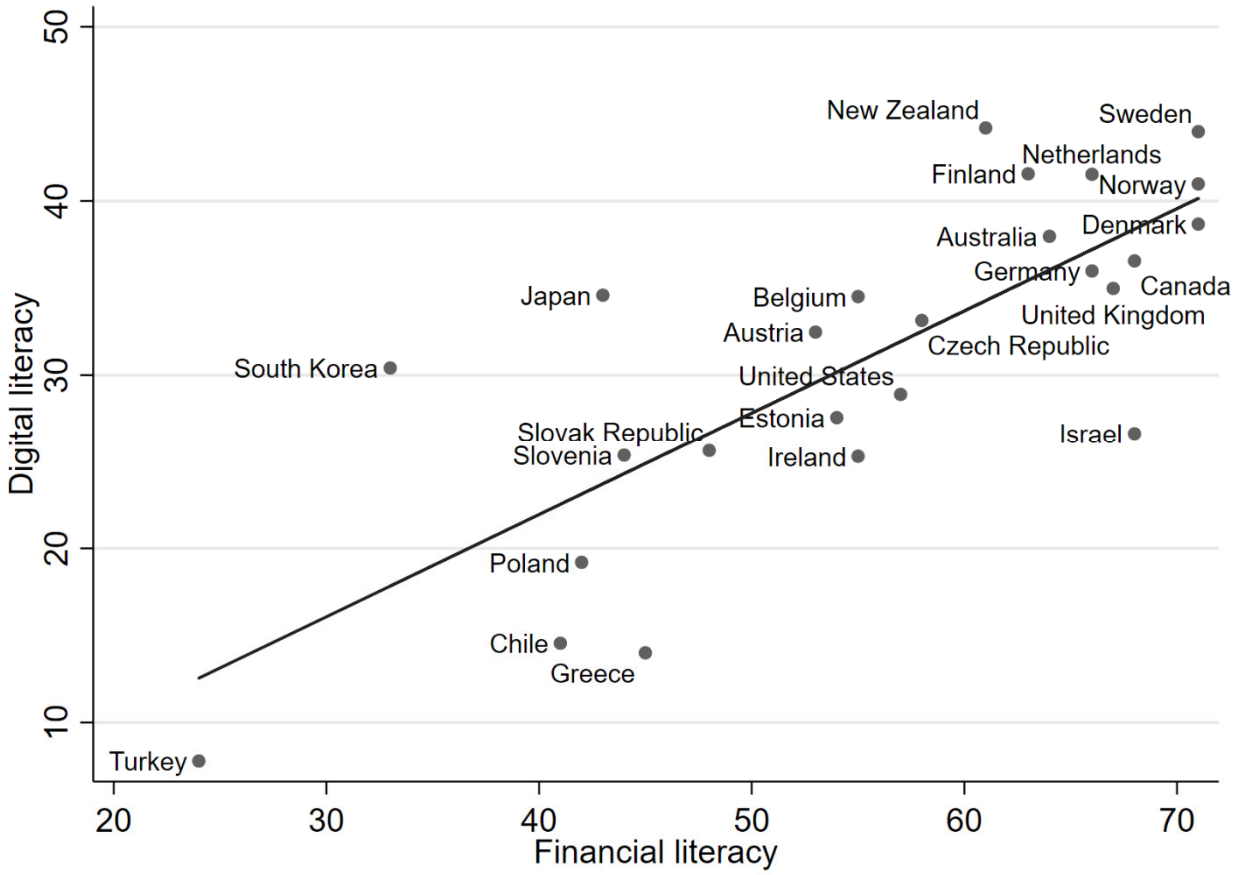

Table 1. Descriptive statistics

Variable name	N.	Mean	Std. Dev.	Min	Max
Digital literacy	25	31.1	9.7	7.8	44.2
Financial literacy	25	55.5	12.8	24.0	71.0
GDP per capita	25	39173	18670	13267	89375
Population (millions)	25	37.4	65.9	1.3	315.9
Dependency ratio	25	33.7	2.6	26.9	38.8
Digital payments	25	76.2	19.1	29.0	98.4
Currency and deposits	25	34.0	17.1	12.7	75.4
Pension fund assets	22	19.6	17.3	0.0	55.6

Notes: the table reports information on the variables not transformed.

Table 2. Digital payments.

	[1]	[2]	[3]	[4]
	Digital payments	Digital payments	Digital payments	Digital payments
Digital literacy	1.30***		1.31***	1.59**
	(0.21)		(0.28)	(0.66)
Financial literacy		0.49**	-0.03	0.13
		(0.23)	(0.18)	(0.40)
GDP per capita	21.94***	40.05***	22.26***	21.99***
	(6.11)	(13.25)	(6.88)	(7.07)
Population	-1.89	-2.44	-1.93	-1.87
	(1.30)	(1.65)	(1.31)	(1.28)
Dependency ratio	-0.24	-0.53	-0.21	-0.17
	(0.59)	(0.94)	(0.57)	(0.63)
Digital lit.*Fin.lit.				-0.01
				(0.01)
R-squared	0.88	0.74	0.88	0.88
Observations	25	25	25	25

Notes: OLS estimation. Robust standard errors in parenthesis. The symbols *, **, and *** denote significance at the 10 percent, 5 percent, and 1 percent levels, respectively.

Table 3. Personal finance.

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
	Currency and deposits	Currency and deposits	Currency and deposits	Currency and deposits	Pension fund assets	Pension fund assets	Pension fund assets	Pension fund assets
Digital literacy	-0.85*		-0.23	-0.60	0.46		-0.45	-0.42
	(0.42)		(0.50)	(0.80)	(0.65)		(0.67)	(0.96)
Financial literacy		-1.08***	-0.99***	-1.20**		0.97**	1.17***	1.19*
		(0.22)	(0.31)	(0.53)		(0.41)	(0.32)	(0.58)
GDP per capita	-7.30	1.54	4.65	5.01	2.81	-12.40	-7.14	-7.15
	(14.00)	(14.78)	(13.88)	(13.96)	(19.33)	(18.84)	(20.99)	(21.65)
Population	0.34	-1.03	-1.12	-1.20	2.97	4.54*	4.44*	4.45*
	(2.46)	(1.91)	(1.94)	(1.98)	(2.41)	(2.37)	(2.41)	(2.49)
Dependency ratio	-0.39	0.84	0.79	0.74	-0.37	-1.14	-1.06	-1.06
	(1.24)	(0.86)	(0.90)	(0.94)	(1.72)	(1.15)	(1.14)	(1.18)
Digital lit.*Fin.lit.				0.01				-0.00
				(0.01)				(0.02)
R-squared	0.36	0.51	0.52	0.52	0.12	0.28	0.30	0.30
Observations	25	25	25	25	25	25	25	25

Notes: OLS estimation. Robust standard errors in parenthesis. The symbols *, **, and *** denote significance at the 10 percent, 5 percent, and 1 percent levels, respectively.