OESTERREICHISCHE NATIONALBANK
EUROSYSTEM

OeNB Financial Literacy Evaluation Series 2024/03
43 pages

Financial literacy in research and policymaking: the concept at the core

In this paper, we explore financial literacy from multiple perspectives. We explore how a deceptively simple idea has evolved into a complex scientific concept and a diverse set of policy goals. With many organizations involved, definitions of financial literacy differ in important ways. Similarly, methods of measuring financial literacy differ widely, and research on its causes and effects often leads to uncertain conclusions.

Authors

Maximilian Zieser
OeNB, Financial Literacy and Culture Division
maximilian.zieser@oenb.at

Valentin Voith
OeNB, Financial Literacy and Culture Division
valentin.voith@oenb.at

Theresa Lorenz
OeNB, Financial Literacy and Culture Division
theresa.lorenz@oenb.at

Sofia Anyfantaki
Bank of Greece, Economic Analysis and Research Department
sanyfantaki@bankofgreece.gr

What is financial literacy?

Unfortunately, there is no simple answer. The term "financial literacy" typically includes some form of ability in financial areas. However, there is no shared understanding of how to define or measure it. Clearer definitions and measurement methods will be needed to draw meaningful conclusions.

Who works in financial literacy?

A wide range of stakeholders are involved in financial literacy: researchers, international organizations like the OECD and the World Bank, national governments, schools, NGOs, private banks, and even social media influencers – each with distinct roles, goals and approaches.

What are the causes and effects?

Financial literacy is influenced by factors like age, income and general education. Its impact on financial behaviors and financial well-being is debated: Some studies show lasting benefits; others find only limited effects from financial education.

Opinions expressed by the authors of studies do not necessarily reflect the official viewpoint of the Oesterreichische Nationalbank, the Bank of Greece or the Eurosystem.

Abstract

Financial literacy has become an increasingly important research and policy topic in the past decades and has been adopted by a multitude of stakeholders. However, there is little consensus on how to define financial literacy, how to measure it or how empirically relevant it is. For related financial education interventions, evaluations and research to be successful, however, it is essential to have a clear idea of the underlying concept and its potential implications. This paper aims to provide both an overview of and guide to the concept by exploring six perspectives of financial literacy: its historical origins, its key stakeholders, its various definitions, the approaches to its measurement, its determinants and its potential impact. Indeed, we find that concepts of financial literacy, and thus its implications for research and policymaking, vary considerably. We therefore recommend using coherent definitions and a rigorous approach to measurement and reporting to ensure that future evaluation and research projects produce meaningful, interpretable and comparable results.

Introduction

Many public and international institutions such as central banks, the Organisation for Economic Co-operation and Development (OECD) or the World Bank have embraced financial education and financial literacy as policy goals, stressing their importance for people's personal financial well-being and their potential wider implications for economic and financial stability. There has also been a notable surge in academic interest in financial literacy, with a tenfold increase in related publications between 2014 and 2022 (Zaimovic et al., 2023). Moreover, attention to the topic extends far beyond policymaking and research, encompassing the media (e.g. Barrett, 2023; Pfluger, 2023), private banks (e.g. Erste Bank und Sparkasse, 2023; Santander, 2023) and even social media platforms ("finfluencers" in particular, see e.g. Haase et al., 2023).

At the same time, related research is characterized by considerable heterogeneity (Goyal and Kumar, 2021; Ingale and Paluri, 2022), with a large number of different definitions having been proposed by researchers and policymakers alike (see Cude, 2022). In addition, a great variety of measurement approaches are in use (Ouachani et al., 2021). While these developments have greatly extended the scope of the concept of financial literacy, they may prevent the direct comparison of empirical results and the drawing of clear conclusions on the effectiveness of financial education and the relevance of financial literacy. Researchers, policymakers and educators thus face fundamental questions: What exactly is financial literacy? How can it be measured? How can it be improved? How does it affect people's lives?

While this paper cannot provide conclusive answers to these questions, it aims to distinguish different definitions of financial literacy and approaches to measure it, help assess its empirical relevance and enable targeted decisions in defining and quantifying it. To this end, we explore six different perspectives of financial literacy, namely its historical origins, its key stakeholders, its various definitions, the approaches to its measurement, its determinants and its potential impact.

In section 1, we establish the historical and institutional background to help readers understand the circumstances under which the concept of financial literacy has been shaped and is being promoted. We find that questions of economically efficient and sustainable decision-making were already of interest to ancient Greek philosophers. The concept of financial literacy in its modern sense, however, has only recently emerged as a focal point of international organizations, national institutions and empirical research.

Building on section 1, section 2 introduces the major players in the field of financial literacy and financial education. Besides discussing related work by influential international organizations such as the OECD and

the World Bank, we provide brief insights into public efforts at the national level and critically examine the role of private financial education providers.

In section 3, we consider fundamental theoretical questions concerning financial literacy, namely its different definitions and their potential implications. We find that the concept of financial literacy has evolved to include a wide range of traits and behaviors, with many definitions now asserting financial well-being as the central outcome of financial literacy. We provide an overview of popular definitions of financial literacy and closely related concepts and conclude with a summary of key differences in the central theoretical assumptions underlying these definitions.

Section 4 shows how different notions of financial literacy are also reflected in the range of measurement approaches used. For example, well-established knowledge tests have been adapted to also cover respondents' financial behavior and attitude, as in the International Survey of Adult Financial Literacy (ISAFL) of the OECD's International Network on Financial Education (INFE). On the other hand, competence-oriented instruments such as the OECD's Programme for International Student Assessment (PISA) financial literacy test focus on capturing financial literacy as a latent trait. We also show that seemingly minor differences in methodology can, in the aggregate, produce strikingly different results. We conclude section 4 with critical methodological considerations regarding the measurement of financial literacy.

Sections 5 summarizes the existent research on the most common determinants of financial literacy. We find that various sociodemographic and socioeconomic factors, along with macro-level factors, appear to significantly affect financial literacy. In addition, empirical studies paint a mixed picture of the role financial education plays: While the effects of financial education on people's financial behavior have been described as small and declining quickly over time (Fernandes et al., 2014), more current evidence points to significant and meaningful effects (Kaiser et al., 2022). Any such conclusions, however, depend heavily on the studies and financial education interventions considered.

Section 6 briefly explores effects of financial literacy on financial behavior, financial resilience and financial vulnerability as well as its impact on financial well-being. While significant links have been found between financial literacy and financial well-being, other context factors appear to be the predominant determinants of financial well-being (e.g. ANZ Bank New Zealand Limited, 2021). For reliable causal conclusions concerning the effects of financial education on financial well-being, more research and rigorous evaluations are needed.

Although we find remarkable progress in the field, it comes with considerable ambiguity in the definitions of financial literacy itself, in measurement approaches and in empirical results. With this paper, we therefore aim to provide a starting point and guide for researchers, policymakers and educators working in this field. We do not attempt to replicate the scope or depth to be found in handbooks on financial literacy (in particular Aprea et al., 2016; Nicolini and Cude, 2022) or topic-specific literature reviews (e.g. Compen et al., 2019; Lyons and Kass-Hanna, 2021). Instead, we aim to give a structured, accessible overview of the concept at the core of a vast field of research and policymaking.

1 Origins and evolution of the concept of "financial literacy"

Questions on the efficient use of personal resources to achieve, maintain and increase individual prosperity are as old as market economy itself. One of the earliest systematic discussions of the subject is the philosophical dialogue *Oikonomikos (The Economist)* by Greek philosopher Xenophon, which dates back to the 4th century BCE, presumably. In line with the original meaning of the word "economics," this work deals with the proper management of a house or estate (Xenophon, ca. 360 BCE [2008]). While it discusses fundamental concepts in the context of an ancient society, it provides timeless insights that still appear relevant today.

Throughout the modern era, practice-oriented scholars occasionally gave advice on financial affairs as well: In one of his famous essays, Renaissance philosopher Francis Bacon highlighted the importance of controlling one's expenses and regularly saving a certain share of one's income for a rainy day (Bacon, 1596 [2018]). In a similar vein, Benjamin Franklin published "Necessary hints to those that would be rich," pointing, inter alia, to the additional costs that arise when buying things on credit (Franklin, 1736 [1794]).

There is also a long tradition of advice literature on the proper handling of personal finances for different fields of application, including guidebooks for entrepreneurs, e.g. *The Art of Money Getting* (Barnum, 1880 [2013]), for administrators, e.g. *The Young Clerk's Manual* (Unknown, 1848), or for housekeepers, e.g. *The American Frugal Housewife* (Child, 1828 [2020]). Laying the cornerstone of a whole new genre which enjoys great popularity to this day, George S. Clason's book *The Richest Man in Babylon* (1926) can be regarded as the first modern classic of personal financial advice literature. There, by means of illustrative parables, readers learn about the "Seven Cures for a Lean Purse" and the "Five Laws of Gold," which address, for example, the temptation of lifestyle inflation, the use of compound interest in investing or the dangers of scams. Like in its contemporary counterparts, the rules and principles taught are mainly based on anecdotal evidence and practical experience rather than on a rigorous scientific approach.

Throughout the 20th century, the introduction of consumer protection regulations was accompanied by consumer education programs, e.g. by the Federal Trade Commission in the USA or the Citizens Advice Bureau in the UK, which also aimed to promote prudent financial behaviors among the wider population. Before the term "financial literacy" was coined, pioneering academic work was carried out in university programs comprising research and courses on *consumer economics* or *household finances* (Hira, 2009). It was not until the late 1990s and early 2000s that financial literacy was gradually established as an autonomous research field (Faulkner, 2015).

The Anglo-Saxon countries led the way in developing financial literacy, both as a concept and as a topic in national policies. In New Zealand, coordinated financial literacy policies were first sparked in 1992 through a Taskforce on Private Saving for Retirement (Cameron and Wood, 2016). One of the first financial literacy initiatives by name, dating back to 1995, was the Jump$tart Coalition for Personal Financial Literacy, which brought together private, nonprofit and public stakeholders to foster the integration of financial education in school curricula and provide expertise for policymakers in the USA (Jump$tart, 2024). In 2003, the UK Financial Services Authority began to develop the first national strategy for financial capability. While these early initiatives shared the common goal of empowering people to make informed financial decisions, their emergence is also closely linked to the growing trend of household savings being invested in the stock market during and after the economic boom of the 1990s (Wolf, 2018).

The idea of educating consumers in financial literacy quickly gained momentum among established international organizations, especially the World Bank and the OECD, with the latter establishing its International Network on Financial Education (INFE) in 2008 (see Kovács and Terták, 2019) and each organization developing and further refining the concept of financial literacy as such (see sections 2 and 3).

During this period, the significance of financial literacy increased further as financial products became increasingly complex and digitalized (Faulkner, 2015). While not isolated from other developments, the global financial crisis of 2007 and 2008 can be viewed as an important catalyst of financial literacy policies as private households were seen not only as victims but, given their poor understanding of financial products, also as an important factor contributing to the crisis (see Kovács and Terták, 2019).

Besides the fact that attention in financial literacy increased, the concept itself also underwent significant progress in terms of definition and scope. Until the early 2000s, financial literacy was largely understood as *financial knowledge*. However, it continuously evolved to comprise a much broader concept (see, e.g., Holzmann, 2010). Moreover, public bodies and international organizations like the OECD have considerably expanded the concept to include components beyond knowledge. Others, like the World Bank with its concept of *financial capability*, developed their own approach.

Recently, a broader concept of financial literacy has been integrated into a comprehensive framework of *financial well-being*, which now represents the overarching goal of financial literacy for many organizations and their initiatives, such as PISA (OECD, 2012d), OECD/INFE (OECD, 2020c) and the US Consumer Financial Protection Bureau (CFPB) (CFPB, 2015). In parallel, national strategies are shifting their focus toward financial well-being, replacing the previous emphasis on financial literacy (see OECD, 2022a).

Naturally, the overall evolution of and growing attention to financial literacy are reflected in its complexity and nuances as well as a drastically increasing volume of related publications and citations (see Goyal and Kumar, 2021). Indeed, the annual volume of published works on financial literacy increased tenfold between 2014 and 2022 (Zaimovic et al., 2023), reflecting a stronger focus on the various subdomains, assessments, effects and determinants of financial literacy as well as the growing number of stakeholders involved in both financial literacy and financial education.

2 Institutions and providers of financial education

2.1 OECD

The OECD promotes and assesses financial literacy predominantly within its International Network on Financial Education (INFE) and through its Programme for International Student Assessment (PISA). While INFE and PISA are both coordinated by the OECD and follow a similar understanding of financial literacy, they are based on rather different concepts and measurement approaches. While INFE measures financial literacy as a combination of knowledge, attitudes and behaviors, for PISA it is a latent competence that is visible in effective financial decision-making. Further insights into different definitions of financial literacy are discussed in section 3. Large-scale measurement efforts, including the OECD/INFE International Survey of Adult Financial Literacy (ISAFL) and the PISA financial literacy tests, are presented in section 4.

The OECD established INFE in 2008. With over 130 participating economies, this is the most comprehensive international effort to foster financial literacy in the world. Its main activities include the systematic collection and analysis of cross-country financial literacy data on a regular basis (see subsection 4.2), the formulation of related policy instruments and evaluation methodologies and the exchange on good practices in financial education (OECD, 2023b). Full membership is open to public authorities and is typically held by central banks or ministries closely associated with the topic, which can actively participate in specialized working groups.

Currently, the INFE working groups address the implementation, evaluation, digitalization and sustainable financing of financial literacy and education (OECD, 2023b). The comprehensive reports prepared by

the working groups are intended to serve as guidance for policymakers. Influential examples of OECD/INFE outputs that shaped the understanding of financial literacy and education in different contexts include the High-level Principles on National Strategies for Financial Education (OECD, 2012c), the Core Competency Frameworks for youths and adults (OECD, 2015b, 2016a), the OECD/INFE Guidelines for Financial Education in Schools (OECD, 2012b) as well as the OECD/INFE Survey of Adult Financial Literacy (OECD, 2023c) including a measurement toolkit (OECD, 2022c).

2.2 World Bank

As part of its development mandate, the World Bank's commitment to financial education is primarily intended to contribute to effective financial intermediation as an important prerequisite for reducing poverty and increasing prosperity, particularly in low- and middle-income countries (Holzmann, 2010; Holzmann et al., 2013). Strengthening financial capability should counteract undesirable phenomena, such as overindebtedness and fraud, and thereby increase individual well-being as well as the stability of financial markets (World Bank, 2014). Besides financial education, financial inclusion and financial consumer protection are assigned critical roles in achieving these goals (Perotti et al., 2013, p. 7).

From 2008 to 2013, the World Bank conducted its most comprehensive financial literacy project under the Russia Financial Literacy and Education Trust Fund. Its main objective was to provide knowledge and evidence in order to guide low- and middle-income countries in their implementation of national financial education strategies. To this end, the World Bank developed its own positivist financial capability framework and measurement approach based on empirical research that was carried out in different regions of the world (see subsections 3.2 and 4.3). Using this framework and measurement approach, it was possible to detect weaknesses in the financial capability for various population segments across different regions and cultures (Kempson et al., 2013).

The World Bank also addressed evaluation and impact assessment as a crucial part of financial education interventions to determine if and how financial education can enhance financial capability (Holzmann et al., 2013). As a result of these efforts, an evaluation toolkit was created that is specifically aimed at financial education programs in low- and middle-income countries (Yoong et al., 2013). Its main purpose is to provide guidance to those wanting to perform high-quality evaluation that can causally attribute possible changes in financial literacy or capability to the corresponding interventions. The World Bank also accompanied and advised a number of evaluation exercises for financial education measures (Holzmann et al., 2013).

The World Bank's outcome-oriented approach implies that the reasons behind advantageous financial decision-making are secondary. The World Bank is thus open to interventions beyond traditional financial education, including edutainment, social marketing and behavioral economics-based approaches (Holzmann, 2010). Despite being strong supporters of financial education in principle, the World Bank has expressed strong scientific skepticism about the actual effectiveness of financial education interventions: "One general observation seems to be that the more rigorous the evaluation, the less likely the program is to demonstrate a positive impact" (Holzmann et al., 2013, p. xxiii).

2.3 Other international efforts

As the UN agency dedicated to promoting decent work for all, the International Labour Organization (ILO) started a financial education program back in 2006, with the twofold aim of expanding access to financial services and assisting people in making informed financial decisions. Bringing together governments, employers, employees and workers, the ILO adopts a holistic approach, utilizing various channels to enhance financial literacy on a global scale. On the one hand, through a network of trainers the ILO conducts

workshops that directly target the ultimate beneficiaries of financial education (e.g. youths, migrants or entrepreneurs). On the other, it provides materials, tools and expertise to various stakeholders that want to promote financial education within their sphere of influence as providers or multipliers (ILO, 2024a, 2024b).

While the movement is no longer active itself, the influence of Child & Youth Finance International (CYFI), established in 2011, is still felt through its initiatives that are now continued by other major players. CYFI can be regarded as the largest private international effort to make financial education for young people a policy priority. It achieved this by creating a social movement advocating financial inclusion and financial education, with the aim of bringing about a "system change" in both the finance and education sector (CYFI, 2019). Its most prominent initiative is the *Global Money Week*, an awareness-raising campaign that mobilizes thousands of organizations in over 100 participating countries and is currently coordinated by the OECD/INFE (OECD, 2022b).

Other important stakeholders in financial education are private banks, which, especially in Europe, form international networks to represent common interests in face of supranational legislature and regulation. Notably, the European Banking Federation (EBF) advocates policies that promote financial literacy and education and runs its own initiatives such as the *European Money Quiz* and the *European Money Week*, targeting young people as potential beneficiaries. Furthermore, the EBF pleads for better cooperation between public and private stakeholders, referring to positive examples like the International Federation of Finance Museums, where private and public museums engage in productive exchanges. The EBF itself does not see any inherent contradiction in private stakeholders assuming a dual role as promoters of financial education on the one hand and profit-seeking providers of financial products on the other (Frenken and Folcher, 2020).

2.4 National strategies

Driven by the OECD's financial education initiative in the early 2000s and further fueled by the 2008 financial crisis, which was interpreted by some as a consequence of consumers' financial incompetence (e.g. Dinwoodie, 2010; Shiller, 2008), public institutions in many countries began to become increasingly active in financial education. Their efforts frequently resulted in the drafting of national strategies for financial education, i.e. coordinated approaches aimed at achieving common goals related to financial literacy and financial well-being at the national level (OECD, 2012c). Such strategies are often led by public authorities responsible for financial and/or educational matters, such as ministries of finance or education, financial regulatory authorities or central banks.

The OECD defines certain principles that should be adhered to when creating such national strategies (OECD, 2012c, 2015a): In a preparatory phase, the financial education initiatives that already exist in a country should be mapped and representative surveys should be carried out to establish the level of financial literacy and people's financial situation. In a next step, in a coordinated process of exchange, different stakeholders from the public, private and nonprofit sectors should agree on overarching goals, develop a common code of conduct and establish quality standards. Resources should also be allocated to monitoring and evaluating the national strategy to determine whether progress is actually being made with respect to predefined performance indicators.

The national financial education strategies of developed countries are substantially similar in content as they often address similar challenges. Population aging, for example, which causes the number of workers to decrease against that of retirees, creates pressures to reform public pension systems, which already record significant budgetary deficits (Arrondel et al., 2022; Letkiewicz, 2022; Van der Schors and Simonse, 2016). It is anticipated that future generations will increasingly need to rely on themselves for retirement

planning and, therefore, require greater financial competence to independently build assets that ensure a comfortable retirement.

Another issue is that a substantial share of the population in Western industrialized nations has limited or no financial buffers (Arrondel et al., 2022; Letkiewicz, 2022; Stillwell, 2016; Van der Schors and Simonse, 2016), which makes them vulnerable to financial hardship in case of unexpected expenditure shocks or loss of income. Here, national financial education strategies seek to raise awareness for the importance of making emergency savings to be able to cope with unexpected financial shocks. Many developed countries also record large numbers of cases of overindebtedness, particularly among young people (Arrondel et al., 2022; Heath, 2016; Letkiewicz, 2022; OECD, 2021a; Stillwell, 2016; Van der Schors and Simonse, 2016). In view of easy access to credit, many national strategies aim to help people understand the business interests behind financial products and make people aware that financial decisions that provide short-term gratification (such as impulse purchases) threaten their long-term financial well-being.

Despite their substantial overlap in terms of topics and content, national financial education strategies are flexible enough to address country-specific challenges, as the following examples show:

- The *US National Strategy for Financial Literacy 2020* emphasizes the role of wide-spread high-quality housing counseling in assisting home buyers, homeowners and renters in making sound financial decisions (US Financial Literacy and Education Commission, 2020).
- Spain's *Financial Education Plan 2022–2025* focuses on university students studying subjects that are not directly or indirectly related to economics or finance (Comisión Nacional del Mercado de Valores, Banco de España and Ministerio de Asuntos Económicos y Transformación Digital, 2022).
- The *UK Strategy for Financial Wellbeing 2020–2030* includes mental health as a cross-cutting perspective, as people with mental health problems are particularly vulnerable to financial hardship (Money & Pensions Service, 2020).
- Canada's *National Financial Literacy Strategy 2021–2026* declared "reducing barriers [...] that hinder people from accessing, understanding, and using appropriate financial products, services, and information to their benefit" (Financial Consumer Agency of Canada, 2021, p. 17) a strategic priority to ensure that the financial world is more inclusive toward people with disabilities, the elderly, immigrants and linguistic minorities.
- Austria's current *National Financial Literacy Strategy* gives great attention to gender equality issues, seeing financial education as a tool to counteract the persistent gender gaps in pension benefits, income and wealth (OECD, 2021a).
- Greece's *National financial literacy strategy for Greece* pursues seven main objectives: reducing overindebtedness, encouraging long-term financial planning, promoting the safe use of digital financial services, informed participation in capital markets and tax compliance, preventing gambling and supporting financial literacy stakeholders in implementing education programs (OECD, 2024a, p. 14).

Advocacy groups such as trade unions, employers' organizations and other professional associations are sometimes directly involved in the design and implementation of national financial education strategies. However, they also frequently address financial education in their own domains, targeting their stakeholders or the general public. The potentially political nature of financial education may be reflected in the way the prioritization of these topics differs across institutions. In Austria, for instance, employers' organizations tend to focus more on the management of personal finances and the functioning of financial products (e.g. Wirtschaftskammer Wien, 2023), while trade unions or related organizations may put a stronger emphasis on employee rights and social inequality (e.g. Arbeiterkammer Wien, 2023).

2.5 Financial education in schools

Numerous national strategies, alongside initiatives led by nonprofit organizations (NPOs) and private entities, share the common objective of integrating financial education more fully into school curricula. In line with a future-oriented focus of financial education, the common reasoning is that enhancing financial literacy among young people is likely to have a bigger influence on their long-term financial security and well-being, given that major life decisions are still ahead of them and they are not yet responsible for earning their living. Making financial education a mandatory part of the standard school curriculum ensures that all students have access to this knowledge. This counteracts disparities in financial literacy resulting from different social backgrounds.

As to the extent to which financial education is currently integrated into the school systems of developed countries, one pattern becomes apparent. If a country's political system is characterized by strong federalism, the amount and content of financial education taught at school usually varies substantially within that country. Primary examples are Germany and the USA. Without a single body at the national level that has the authority to determine if and how financial education is taught at school, pursuing a uniform and coordinated approach in financial education is a lot more difficult in federalist countries than in centralized ones (Frühauf and Retzmann, 2016; Heath, 2016).

In many countries at least some form of basic financial literacy is taught at elementary school. Teaching content usually includes everyday economic relationships, the concept of money and the benefits of saving (Ackermann and Eberle, 2016; Greimel-Fuhrmann et al., 2016; Lacatus, 2016; Van der Schors and Simonse, 2016). In lower secondary school, elements of financial education are often integrated into other subjects. Typically, these subjects are mathematics (e.g. percentage calculation, interest calculation and business calculations), (social) sciences (usually comprising not only financial education but also economic education) or "general knowledge" subjects imparting useful practical knowledge (Ackermann and Eberle, 2016; Faulkner, 2022; Greimel-Fuhrmann et al., 2016; Van der Schors and Simonse, 2016).

Regarding upper secondary education, students in some developed countries can choose between continuing their general education at a higher level or enrolling in a vocational school to be trained in a specific vocation. Vocational schools, particularly those dedicated to business administration and commerce, assign significantly more time and resources to financial and economic content than general-education upper secondary schools (Ackermann and Eberle, 2016; Frühauf and Retzmann, 2016; Greimel-Fuhrmann et al., 2016). Despite being likely to foster consumer financial literacy, the curriculum at vocational schools is dominated by the supply-side perspective. For those students who continue general education at the upper secondary level, financial education is rarely a compulsory subject. Some schools draw on external financial education providers, which may be public, nonprofit or private organizations.

In view of the relatively low emphasis placed on financial education, many supporters of financial education advocate a redesign of school curricula. Redesign proposals range from giving personal finance-related topics more weight within existing subjects to establishing a subject exclusively dedicated to financial or economic education (Faulkner, 2022; Henager and Kabaci, 2022). Even though the comparatively recent popularity of financial literacy has resulted in the setting-up of many projects aimed at potentially adapting school curricula, there are still substantial challenges to implementing financial education at schools. First, there is little consensus regarding the scope and content of financial literacy education (Frühauf and Retzmann, 2016). Second, standardized teacher training in financial or economic education is scarce, with some countries also lacking officially approved high-quality teaching materials (Faulkner, 2022; Frühauf and Retzmann, 2016; Henager and Kabaci, 2022; Stillwell, 2016). Last but not least, people's personal financial affairs may still be considered taboo, which makes the implementation of related content a delicate affair (Stillwell, 2016).

2.6 Private financial education providers

There is a wide range of private stakeholders active in financial education. A significant group are for-profit financial sector companies, typically banks and insurance companies, which provide financial education in addition to their core business activities (Frenken and Folcher, 2020). In addition to these, there are for-profit companies that specialize in financial education itself, making profit by marketing related seminars, counseling sessions or digital content. While some of these specialized providers focus on classical personal finance issues, many more focus on wealth creation, entrepreneurship and investing. Finally, an increasing number of "finfluencers" reach large audiences by providing finance-related content on social media platforms (Guan, 2023; Haase et al., 2023).

Another type of private stakeholders providing financial education are NPOs. NPOs are funded by public subsidies, private donations or corporate sponsorships. While they may be regarded as impartial and objective (Collins, 2011), their sponsors may still have an influence on their way of providing financial education. Again, NPOs active in financial education differ in terms of focus, format and target groups, with their services ranging from offering one-on-one counseling for working adults to conducting workshops for financially vulnerable young persons in "problem schools."

Despite being pursued by public authorities, national financial education strategies generally encourage involving private financial education providers to help reach the overarching goal of strengthening financial literacy and, ultimately, the financial well-being of the population (OECD, 2012c). To ensure certain quality standards and avoid open conflicts of interests, such private actors are frequently required to commit to a code of conduct that prohibits advertising, ensures the accuracy of information and demands a certain degree of impartiality (OECD, 2015a). Although public-private partnerships can effectively promote financial literacy, many public bodies are reluctant to collaborate with private institutions, given concerns about aligning objectives and maintaining public trust.

In particular, educational efforts of financial service providers may give rise to conflicts of interest. While there is general consensus that the label "financial education" should not be misused for advertisement, financial service providers frequently consider providing financial education a win-win scenario (Frenken and Folcher, 2020). While consumers may benefit from financial literacy in terms of their financial well-being, financial service providers may benefit from consumers who demand more financial products and are more reliable in their loan repayments (Kuchciak and Wiktorowicz, 2021). However, some scholars doubt whether financial sector firms are genuinely committed to financial education beyond using it for their own gains (e.g. Willis, 2008).

Fraudulent activities have been reported with regard to private finance or investment coaches. In some cases, entrepreneurship or investment education served as a guise for what amounted to de facto Ponzi schemes (Europäisches Verbraucherzentrum Österreich, 2023b). Moreover, some finance coaches were found to use questionable sales tactics and exploit consumers' unrealistic desires and expectations about wealth and prosperity (Europäisches Verbraucherzentrum Österreich, 2023a). Consumers should thus be cautious about the credibility of financial education providers and the promises they make. Indeed, being able to identify and access trustworthy sources of information has been identified as a key component of financial literacy (European Union and OECD, 2022; Holzmann et al., 2013).

3 Definitions of financial literacy, financial capability and financial competence

Financial literacy can be considered the core concept of a field of research concerned with the knowledge, abilities and behaviors necessary for positive financial outcomes and well-being. Indeed, Goyal and Kumar (2021, p. 89) find in a keyword analysis that "financial literacy" has become a termed concept and

by far the most prevalent term in the relevant literature. However, despite or perhaps due to the deceptively self-explanatory nature of financial literacy, scholars have not yet agreed on a consistent definition (Cude, 2022; Huston, 2010; Remund, 2010).

In fact, there seem to be as many definitions of financial literacy as there are organizations promoting it. Moreover, related terms, such as *financial capability*, are sometimes used as synonyms for financial literacy, yet sometimes also to clearly distinguish other concepts from the well-established term of financial literacy or to highlight distinct aspects. The scope of definitions may also have to be adapted regularly to reflect the changing financial landscape, e.g. to take into account aspects of digitalization (Koskelainen et al., 2023) or sustainable finance products (OECD, 2023a). To illustrate how complex the concept of financial literacy is and to provide insights into popular definitions and related concepts employed in research and policymaking, this section explores the term "financial literacy" and other terms used in the literature.

Goyal and Kumar (2021) find that besides financial literacy, the terms *financial education*, *financial capability*, *financial knowledge* and *financial behavior* are most commonly used in the literature. "Financial capability" as an alternative term and concept is discussed in detail in a separate subsection below. "Financial knowledge" and "financial behavior" are explored as parts of the superordinate definitions. "Financial education," on the other hand, is presented briefly in subsection 5.4 as a determinant of financial literacy. We also include *financial competence*, a term that is rarely used in the field of financial literacy but that may be significant for conceptualizing or operationalizing financial literacy. Moreover, we briefly touch on *digital financial literacy* as it is becoming more and more congruent with financial literacy, and on *economic literacy*, which has become increasingly important in some countries' school curricula.

3.1 Financial literacy

For quite some time, financial literacy was commonly understood as financial knowledge. Its measurement, especially, used to consist of a few short knowledge questions on topics such as (compound) interest, inflation and risk diversification. Subsequently, such questions, in particular the "Big Three" and "Big Five" (see subsection 4.1), were used as the basis of numerous studies and have, thus, considerably shaped our understanding of financial literacy (see Haupt, 2022).

However, semantically, the term "literacy" suggests a distinction from "knowledge," in our case indicating a deeper understanding of personal finance and the capacity to make prudent financial decisions – just like the original meaning of literacy suggests the ability to read *and* write. This notion is already evident in one of the earliest definitions of financial literacy by Noctor et al. (1992), who define it as the "ability to make informed judgments and effective decisions regarding the use and management of money" (p. 4).

Indeed, the common understanding of financial literacy has evolved toward a broader concept extending far beyond mere knowledge (Holzmann, 2010). This conceptual expansion may, in part, stem from the observation that (1) knowledge about financial concepts and principles alone does not automatically imply applying that knowledge and translating it into informed financial behavior (Kaiser and Menkhoff, 2017) and (2) psychological traits such as self-efficacy or attitudes appear to be key in translating knowledge into financial behavior (Fernandes et al., 2014).

Definitions of financial literacy from the literature exemplify this observation: Remund (2010) used an extensive literature review to develop a detailed definition, characterizing financial literacy as "a measure of the degree to which one understands key financial concepts and possesses the ability and confidence to manage personal finances through appropriate, short-term decision-making and sound, long-term financial planning, while mindful of life events and changing economic conditions" (p. 284). Lusardi and Mitchell (2014) describe financial literacy as the "ability to process economic information and make informed decisions about financial planning, wealth accumulation, debt, and pensions" (p. 6), thus emphasizing

both the economic nature of financial knowledge and its primary domains of application. Both definitions explicitly refer to having the ability and confidence to make informed or appropriate decisions and are, thus, not limited to the notion of knowledge per se.

The most recent definition of financial literacy by the OECD/INFE regards financial knowledge, attitudes and behaviors as components of financial literacy, referring to financial literacy as "a combination of financial awareness, knowledge, skills, attitudes and behaviors required to make sound financial decisions and ultimately achieve individual financial well-being" (OECD, 2020c, p. 6). This definition includes *behaviors* as components of financial literacy and explicitly connects the concept to the overarching goal of financial well-being (see subsection 6.3). This current definition is also reflected in recent international efforts by the OECD/INFE to measure financial literacy (see subsection 4.2).

In a school education context, PISA's Financial Literacy Analytical and Assessment Framework (OECD, 2023d) does not include behaviors or context factors but refers to financial literacy as a prerequisite of effective financial decision-making: "Financial literacy is knowledge and understanding of financial concepts and risks, as well as the skills and attitudes to apply such knowledge and understanding in order to make effective decisions across a range of financial contexts, to improve the financial well-being of individuals and society, and to enable participation in economic life" (p. 112). Although the PISA framework only occasionally refers to *financial competencies*, it may be regarded as a competence framework in a psychometric tradition, as described in subsection 3.3. In contrast to the OECD definition presented above, PISA's definition not only names individual but also societal financial well-being as a goal.

3.2 Financial capability

Use of the term *financial capability* remains inconsistent in the literature. For instance, in the national financial literacy strategy of New Zealand, the term is used synonymously with financial literacy (New Zealand Commission for Financial Capability, 2021). Other authors use it to highlight the crucial role of behavior as opposed to that of mere knowledge (Serido et al., 2013; Xiao and O'Neill, 2016). As regards international organizations, the term is strongly associated with the World Bank's approach, which adopts a strong stance concerning the distinction between financial literacy and financial capability with regard to their practical application and outcomes.

Concerning fundamental assumptions such as goals and content, the World Bank has employed a positivist approach in defining financial capability by not assuming any normative criteria of "good" behavior. Instead, it defines people's optimal behavior only through the prevalent subjective and social judgment of their peers. Moreover, it has operated under an "agnostic" research paradigm by not assuming any mechanisms of how financial capability may lead to desirable outcomes. By collecting qualitative and quantitative data among the general population, the World Bank thus identifies ten components of financial capability (Kempson et al., 2013; see subsection 4.3).

The World Bank regards financial literacy mainly as financial knowledge, i.e. as a necessary but not sufficient requirement for reaching financial capability. Financial capability itself is defined as "the internal capacity to act in one's best financial interest, given socioeconomic and environmental conditions. Financial capability encompasses the knowledge (literacy), attitudes, skills, and behaviors of consumers regarding understanding, selecting, and using financial services and the ability to access financial services that fit their needs" (World Bank, 2014, p. 1). This definition emphasizes the perspective of the individual, who eventually should be able to act in their best financial interest and choose financial services according to their needs (World Bank, 2014).

The World Bank's definition of financial capability also sets itself apart by acknowledging the role of external factors such as socioeconomic and environmental conditions that are beyond a person's immediate

control. Similarly, Johnson and Sherraden (2007) explicitly include the element of "opportunity to act" (p. 122) in their definition. This perspective puts further emphasis on the potential systemic barriers and the support and resources necessary to benefit from financial capability. The argument that it is important to create an enabling environment by enhancing access to financial services can also be found in the 2015 Financial Capability Strategy for UK (Money Advice Service, 2015).

3.3 Financial competence

Historically, the concept of competence and its assessment emerged, in part, as a response to the common practice of intelligence assessments carried out to predict academic and professional performance (e.g. McClelland, 1973). In contrast to intelligence, competence is commonly regarded as acquired (e.g. through education and training) and specific to real-world situations and tasks. Contrary to definitions of knowledge, definitions of competence typically include a wider range of performance prerequisites, such as cognitive processes, motivation or self-efficacy (e.g. Hartig, 2008; Klieme et al., 2008; Le Deist and Winterton, 2005; Westera, 2001). Notably, unlike observable behavior or environmental context, these characteristics lie within individuals.

However, the scopes of the terms "competence" and "competency" depend on the context and field of research. In general, *competence* on its own can be regarded as a more general ability, and has even been proposed "as a symbol for an alternative approach to traditional intelligence testing" (McClelland, 1973, p. 7). *Competencies* often refer to more task-specific characteristics such as knowledge, skills and values, while they may even solely describe behaviors in a human resources context (see Drisko, 2014). Overall, there is little consensus on what is covered by the terms, and definitions and terminology can vary widely depending on disciplines, cultures and translations.

Reflecting a structured approach to defining characteristics of individuals that lead to positive outcomes, e.g. a certain performance in tasks or informed decisions, "competence models" are often used for educational assessments. In German-speaking countries, for example, competence models regularly serve as the basis for defining competence domains used in school curricula, including "economic competence", and for developing corresponding tests (e.g. Eberle et al., 2016; Kaiser et al., 2020; Retzmann and Seeber, 2016; see also subsections 3.5 and 4.4).

On an international level, PISA's Financial Literacy Analytical and Assessment Framework (OECD, 2023d) only occasionally refers to "competency." Nevertheless, the PISA framework may count as a competence model as described above as it quite clearly defines intrapersonal prerequisites for effective decision-making without including behaviors or context factors. PISA also further defines financial literacy along the dimensions of content, contexts, cognitive processes and noncognitive factors in order to translate the concept into test items, an approach typical of competence models and assessments.

In contrast, the European Union's and OECD's Financial Competence Framework for Adults (European Union and OECD, 2022) follows a different approach. It lists a staggering 564 granular "competences" under four content areas: (1) money and transactions, (2) planning and managing finances, (3) risk and reward and (4) financial landscape. Behavior is explicitly included in three dimensions: (1) awareness, knowledge and understanding, (2) skills and behaviors and (3) confidence, motivation and attitudes. Additional emphasis is placed on competences related to sustainable and digital finance. A similar framework is also available for children and youths (European Union and OECD, 2023).

3.4 Digital financial literacy

Digitalization has greatly expanded the range of financial services available and made the financial landscape even more complex. With reliance on digital platforms increasing, people must not only navigate

novel financial services but also be aware of new phenomena, such as data privacy issues or online fraud (Lyons and Kass-Hanna, 2021). Understanding digital financial products and instruments thus appears crucial to making informed financial decisions and avoiding potential risks (Koskelainen et al., 2023; Morgan et al., 2019; Yakoboski et al., 2018). On the other hand, digital technology may also provide tools to improve financial behaviors. For example, budgeting apps and fintech products that use behavioral nudging may foster beneficial savings habits and help prevent overspending (Koskelainen et al., 2023; OECD, 2018).

Overall, the importance of digitalization has been recognized in financial literacy research in two ways: First, financial literacy definitions and competence frameworks have been expanded to explicitly include digital competences. Particularly worth mentioning are the *Financial competence framework for adults in the European Union* by the European Union and OECD (2022) and the OECD/INFE International Survey of Adult Financial Literacy, which consider digital competencies and online behavior related to financial services and fraud prevention (OECD, 2022c). Second, the stand-alone concept of *digital financial literacy* has emerged in the scientific literature, describing a skill set that complements traditional financial literacy and particularly considers the peculiarities of the digital realm (Lyons and Kass-Hanna, 2022; Morgan et al., 2019). Similar to some definitions of financial literacy, it has been defined as a multidimensional concept that may include knowledge, skills, awareness, know-how, attitudes, behavior and self-protection (Lyons and Kass-Hanna, 2021).

3.5 Economic literacy

Economic literacy or *economic competence* are terms related to financial literacy. While economic literacy is sometimes used as a synonym for financial literacy (Jappelli, 2010; Prete, 2013), it tends to have a broader scope than personal finance, comprising a deeper understanding of economic concepts, theories and principles such as economic growth, unemployment, inflation, fiscal and monetary policies and international trade (McCowage et al., 2022; Walstad et al., 2013). It may also include the ability to develop a critical awareness of economic systems and policies as well as their socioeconomic implications both at an individual and societal level (Soroko, 2022).

Like financial education, the term “economic education” (or “economics education”) has sparked some debate on its definition and goals, particularly regarding the corresponding content in school curricula (e.g. Fridrich, 2019). As mentioned in subsection 3.3, there are various efforts in German-speaking countries to define, foster and measure economic competence (e.g. Eberle et al., 2016; Kaiser et al., 2020; Retzmann and Seeber; 2016). While many considerations concerning financial literacy may also apply to economic literacy and vice versa, a detailed description of the concept of economic literacy and its implications is beyond the scope of this paper.

3.6 Differences in central theoretical assumptions

Overall, as shown above, contemporary definitions of financial literacy and similar concepts always imply elements such as knowledge, understanding or comprehension. Moreover, virtually all stakeholders and their definitions of financial literacy appear to consider financial literacy not an innate trait but, for the most part, the result of education, training, practice or experience. While not all organizations explicitly define financial literacy as acquirable, acquirability can still be regarded as a central assumption of financial literacy definitions that is universally accepted.

Nevertheless, definitions may differ with regard to other central theoretical assumptions, which may not be obvious when looking at the terms alone. In short, definitions of financial literacy and related concepts may vary with regard to the following five key aspects: (1) goals, (2) traits considered, (3) observable

behaviors, (4) thematic focus and (5) context factors. These five aspects are discussed below in further detail.

First, definitions may focus on different goals or outcomes of financial literacy. Some emphasize the quality of people's behavior, referring e.g. to informed, prudent or sound decision-making and implying a rational or utility-maximizing perspective. What qualifies as *good* decisions, however, may continue to be a judgment call. In this regard, the World Bank employs a positivist rather than a normative approach, explicitly defining the quality of decisions and behavior through peer judgment. Many definitions include specific individual or societal outcomes as the ultimate goal of financial literacy. This, in turn, requires clear definitions of the outcomes themselves and ultimately builds on empirical evidence. Possible definitions of the most prominent goal, financial well-being, and its determinants within and beyond the scope of financial literacy are discussed briefly in subsection 6.3.

Second, many definitions are not limited to financial knowledge but include factors such as attitudes, motivation or self-efficacy. This feature can be considered the deciding factor that distinguishes *financial literacy* or *financial competence* from mere *financial knowledge*. The World Bank, however, sees *financial literacy* as a form of knowledge and developed the concept of *financial capability* to capture components beyond mere knowledge. The inclusion of behaviors as components of financial literacy in some definitions further complicates matters, as will be outlined below.

Third, financial literacy could be considered a latent (unobservable), i.e. an *intrapersonal*, ability. As such a latent psychological *construct*, it would be limited to cognitive and attitudinal components only, where behaviors represent potential indicators and likely outcomes but not components. Such an understanding appears to be in line with the way PISA defines and measures financial literacy (see also subsection 5.4). Other definitions, particularly the one given by the OECD/INFE, explicitly include behaviors as components of the concept of financial literacy, which may complicate the distinction of components, outcomes and indicators in theory, measurements and research. It may also diminish a (hypothetical) element of choice by assuming that all people who *are* financially literate must also necessarily *behave* in a financially literate way.

Fourth, concerning their thematic focus, definitions generally appear to rely on a common understanding of the terms "financial" or "finances." More detailed descriptions of topics covered by the required knowledge and skills or of the situations in which financial literacy applies shape definitions considerably and thus determine assessment instruments and education and policy measures. In their definitions of financial literacy, PISA and the World Bank, for example, both specify relatively concrete knowledge areas, attitudes or behaviors. As extreme examples, the financial competence frameworks presented by the European Union and the OECD contain comprehensive lists of granular competences required in specific situations. In other cases, both topics and usage situations may only become apparent through education materials or questions in tests or surveys.

Fifth, context and environmental factors play a central role in shaping people's financial literacy and financial well-being. Most definitions presented above do not explicitly name individuals' (financial) context, situation or opportunities (such as socioeconomic, structural or cultural factors) as parts of the applicable concept of financial literacy. However, the World Bank's definition considers these factors integral parts of financial capability. Just like including behaviors as components of financial literacy, including context factors distinguishes financial capability according to the World Bank from a purely intrapersonal ability.

The five key aspects outlined above offer a structured starting point for developing and interpreting financial literacy definitions. When designing or employing definitions of financial literacy or related concepts, these aspects should be carefully considered as they can affect not only the design of financial education interventions but also their evaluation through measurement and impact assessment. To reduce

ambiguity and enhance the comparability of interventions and evaluations across studies and contexts, we generally recommend that educators and evaluators transparently report the underlying assumptions of the definitions they adopt.

4 Measuring financial literacy

Measuring financial literacy is a crucial part of effective financial education interventions and educational programs and of their evaluations. There are countless methodological approaches to measuring financial literacy levels, ranging from qualitative, interview-based methods to quantitative competence tests. However, as outlined in section 3, definitions of financial literacy vary across disciplines, stakeholders and researchers and there is no common understanding of the concept. Moreover, the advancing digitalization of financial services and the increasing complexity of financial products and processes are constantly adding to the potential set of elements that make up financial literacy. This lack of conceptual uniformity has implications for the development of measurement tools and benchmarks.

Given the lack of consensus regarding definitions and measurement methods, the question of who is financially literate can therefore not be addressed without simultaneously asking how their financial literacy was measured. Using concrete examples, this section focuses on *quantitative* measurement approaches that involve tests and questionnaires employed at the international level, namely the "Big Three" and "Big Five" (Lusardi, 2011; Lusardi and Mitchell, 2011), the World Bank's measurement approach (Kempson et al., 2013), the PISA financial literacy test (OECD, 2024b) and the OECD/INFE International Survey of Adult Financial Literacy (ISAFL) (OECD, 2023c). We then compare results from two seemingly similar international assessments, the ISAFL and the Standard & Poor's Ratings Services Global Financial Literacy Survey (Klapper et al., 2015; hereafter S&P survey). This section concludes with an overview of methodological considerations on measuring financial literacy.

4.1 The "Big Three" and "Big Five"

Focusing solely on the knowledge dimension of financial literacy (Haupt, 2022), the Big Three items were developed by Lusardi and Mitchell as a short and simple instrument to be applied in telephone surveys, face-to-face interviews and online surveys (Lusardi and Mitchell, 2014). First employed in the US Health and Retirement Study in 2004 (see Lusardi and Mitchell, 2006), the Big Three and their variants and adaptations have since become the most widely used items in measuring financial literacy (Haupt, 2022) and have served as the basis for most empirical studies that have been conducted on financial literacy so far.

The Big Three comprise three single-choice questions on compound interest, inflation and risk diversification (Lusardi and Mitchell, 2011, p. 499). A popular variant of the instrument, the Big Five, add the concepts of bond prices and mortgages to the Big Three (see Lusardi, 2011). Questions are either phrased as statements which respondents need to judge as correct or incorrect, or as close-ended questions with up to four answer options, one of which is correct. The score is typically calculated as the sum of correct responses.

Concerning the psychometric properties of the Big Five when used in the USA and in the Netherlands, Lusardi and Mitchell (2011) report that different wording in questions can lead to pronounced differences in results and that the questions may suffer from significant measurement errors. Knoll and Houts (2012) also find some limitations of the test instrument: While the Big Five were deemed suitable as part of the authors' 20-item test instrument that was based on item response theory (IRT, see subsection 4.6), the 20-item instrument more accurately predicted self-reported retirement planning than the Big Five alone. Nicolini and Haupt (2019) also find that the Big Five are not always the best instrument to predict financial behaviors when compared to longer or more specific tests and that their predictive qualities can vary across countries.

Applying IRT to data from the UK, Ranyard et al. (2020) find that the Big Five item on bonds is too difficult and reduces the reliability of the measurement. Nevertheless, the Big Five overall exhibited good sensitivity, particularly through the easier items on interest, inflation and mortgages. However, like the results reported by Knoll and Houts (2012), the authors find that their newly constructed extended instrument predicts financial well-being better than the Big Five. Moreover, they construct a five-item alternative to the Big Five that shows slight improvements over the originals regarding reliability and difficulty.

While their small number of questions cannot assess financial literacy with the same accuracy as test instruments using much longer questionnaires, Lusardi's and Mitchell's Big Three and Big Five proved viable in many contexts despite, or perhaps owing to, their brevity and limited scope. These questions have shaped the understanding of financial literacy on an international scale and may even, in part, be responsible for the dominance of the concepts of "inflation," "interest" and "risk diversification" in the common understanding of financial literacy. Indeed, other ways of operationalizing financial literacy, such as the OECD/INFE ISAFL detailed below, also include these concepts as the main focus of their financial knowledge questions.

4.2 OECD/INFE International Survey of Adult Financial Literacy

The OECD/INFE International Survey of Financial Literacy (ISAFL) aims to systematically assess financial literacy across participating countries in an effort to pinpoint areas for improvement and to inform policymaking accordingly (OECD, 2023c). The survey has been carried out at semiregular intervals in a growing number of countries since 2010, with 39 countries having participated in the most recent wave and Austria having made an additional contribution. A comparison of results from the 40 countries (Austria included) can be found in Voith and Zieser (2024).

Following the OECD/INFE definition of financial literacy, the ISAFL questionnaire covers financial knowledge, attitudes and behaviors and indeed allows for calculating distinct knowledge, attitude and behavior scores. The total financial literacy score it produces is the sum of these three individual scores, giving the most weight to behavior followed by knowledge and attitude (see OECD, 2022c, for the full list of questions). During the design of financial literacy items and corresponding scores, the survey underwent several reliability and validity tests. The OECD reports pilot testing in several countries, cognitive interviews to refine question comprehensibility and statistical analyses to ensure that questions reliably measure the intended concept (Atkinson and Messy, 2012). Besides financial literacy items, the latest questionnaire of the ISAFL test includes digital financial literacy and financial well-being items and proposes methods for constructing indices that reflect these concepts (OECD, 2022c).

In total, seven ISAFL questions contribute to the financial knowledge score, covering the topics of inflation, interest (calculation), compound interest and risk and return in investments. De Clercq (2019) evaluates these financial knowledge questions with 2015 ISAFL data, using IRT. While the results indicate that the knowledge questions indeed appear to capture a unidimensional construct, they also show lacking reliability and discriminatory power, which means that the knowledge questions used may not be able to always reliably discern high levels of knowledge from low levels. De Clerq also finds considerable differential item functioning, which means that difficulty levels of some questions vary disproportionately across countries. This challenges the assumption that the questions are able to capture financial knowledge equally across countries and highlights the risk of misinterpreting country rankings and misdiagnosing problem areas. The author concludes that the ISAFL may not meet the necessary requirements to be considered a proper "international large-scale assessment" (ILSA) in terms of the validity, reliability and comparability of results.

In a study on data from the ISAFL version conducted in Italy in 2013, Bongini et al. (2018) employ IRT and confirm that, overall, the three scores (knowledge, attitudes and behavior) as well as the total score appear to be appropriate measures of (the three dimensions of) financial literacy. However, the authors find that using IRT as opposed to conventional analyses leads to different results with regard to which groups are in need of better financial literacy, concluding that IRT is better suited as an analysis framework for the survey data than other methods. Moreover, they find that typical demographic groups, e.g. women, cannot be treated as homogeneous with regard to survey results and financial literacy needs and should be viewed in a more nuanced way, e.g. in conjunction with their education.

The ISAFL can be considered a cornerstone of financial literacy policymaking in participating countries and constitutes one of the few international efforts to measure financial literacy systematically across a large number of countries. This, however, may also raise requirements concerning psychometric properties such as validity, reliability and cultural fairness, which are already difficult to fulfill in assessments on a much smaller scale. Naturally, however, some compromises concerning psychometric properties appear necessary in light of the administrative challenges of coordinating an assessment in dozens of countries at the same time, producing results that must not only be comparable across countries but also across time.

To illustrate the extent to which methodological differences can affect the outcomes of international surveys, in subsection 4.5 we compare the results of the 2015 ISAFL with another international financial literacy assessment, the S&P survey from 2014. Although both surveys use similar methodological approaches and questions to gauge financial knowledge, we find results to be surprisingly heterogeneous.

4.3 The World Bank

Building on research conducted in the UK (Personal Finance Research Centre, 2005), the World Bank regards *financial capability* as an extension of financial literacy that also includes behaviors and knowledge, skills and attitudes and their interactions (see also subsections 2.2 and 3.2). In a research project focusing on low- and middle-income countries (Kempson et al., 2013) the World Bank developed a measurement approach that differs significantly from the other ways of operationalizing financial literacy presented here.

Concerning the development of the World Bank's financial capability survey instrument, the authors explicitly state the fundamental assumptions underlying their measurement approach: (1) Financial capability is to be considered a latent, underlying capability only measurable through indicators (manifestations) found in the behavior or responses of people, which corresponds to reflective measurement (see also subsection 4.6). (2) Financial capability may be sufficiently described by one domain (or dimension) or could comprise several components, each to be assessed separately. (3) Optimal financial behavior is to be defined only through peer judgement in a positivist as opposed to a normative approach (Kempson et al., 2013). Moreover, no assumptions were made on determinants or processes causing improved patterns or behavior. The World Bank thus operated under an "agnostic" (as opposed to, for example, a cognitive) research paradigm (Holzmann et al., 2013).

In line with these assumptions, the World Bank followed a rigorous bottom-up process by developing its concept of financial capability based on a phase of qualitative exploration. In a first step, the World Bank collected data from among the general population via focus groups in eight countries. It then identified and developed questions suited to capture the manifestations of financial capability as expressed in the focus groups. Questions were subsequently tested through in-depth interviews and pilot surveys, and necessary adaptations were made. Unlike most financial literacy assessments, the resulting instrument does not contain any knowledge questions. Variables for the corresponding analysis were constructed using a considerable number of questions on respondents' behaviors, attitudes and financial situation.

Ultimately, the questionnaire was deployed in seven countries with approximately 20,000 participants (Kempson et al., 2013).

Reporting detailed results of factor analyses on the survey questions, Kempson et al. (2013) conclude that financial capability as operationalized in the World Bank questionnaire is not captured by one single construct, but rather by ten components, namely: budgeting, living within one's means, monitoring expenses, using information, not overspending, covering unexpected expenses, saving, attitude toward the future, not being impulsive and achievement orientation. Two additional components emerged for certain subgroups, namely covering old-age expenses for people aged under 60 and choosing financial products for people who personally chose a financial product in the past five years. Importantly, the authors identified no higher-level domains based on intercorrelations between components.

In five countries, participants completed five knowledge questions on numeracy, inflation and (compound) interest in addition to the main questionnaire. As a result, Kempson et al. (2013) were able to explore links between financial capability and financial literacy (in terms of knowledge). While correlations between the two concepts were generally positive, the authors also found instances of strong negative correlations, which may corroborate the assumption that financial literacy and financial capability are indeed different concepts.

4.4 PISA

Particularly in the context of school education, program evaluations and international large-scale assessments (ILSAs) increasingly rely on accurate assessments of the state and development of competencies through standardized tests (see Baartman et al., 2007). The standardized assessment of students' financial literacy has been part of the OECD's Programme for International Student Assessment (PISA) since 2012. PISA financial literacy assessments were carried out in 2012, 2015, 2018 and 2022 (OECD, 2023d). Like the assessments of the regular domains covered by PISA (reading, mathematics, and science), the financial literacy assessment is used to gauge the related performance of 15-year-olds in many countries around the world, allowing for comprehensive comparisons between countries and assessment periods. At the time of writing, the most current PISA financial literacy results available are from 2022 (OECD, 2024b).

In principle, PISA relies on a competence-based notion of financial literacy with a focus on knowledge, understanding, skills, motivation and confidence (see subsection 3.3). With the goal of assessing these factors, selections of 43 items overall were presented to students in the 2018 PISA assessments (OECD, 2020b). While PISA items still in use are not published to avoid students' prior knowledge of questions, PISA regularly publishes items excluded from the test to illustrate item content and format. Published items address, for example, issues such as distinguishing between fixed and variable costs, understanding loan conditions, reading bank statements or selling something online (see OECD, n.d.).

By using IRT, PISA ensures sufficient psychometric properties, particularly the reliability and fairness of test questions. This IRT-based analysis framework allows PISA to systematically quantify both students' abilities and the difficulty level of test questions and to assess differential item functioning, i.e. whether items behave similarly in different student groups or countries. Moreover, tests designed under the IRT framework can be highly flexible regarding question selection: Only a subset of questions needs to overlap between students or assessment waves, which enables PISA to introduce new questions and still be able to compare financial literacy over time (see OECD, 2020b).

The OECD reports going to great lengths to ensure precise, flexible measurements in PISA that capture abilities rather than focus solely on subject knowledge. However, as for other large-scale student assessments, the test instruments need to find the correct balance between narrowly assessing subject-specific knowledge and overemphasizing general academic abilities, such as reading, or general cognitive ability.

Indeed, the validity of PISA results has been met with doubts as scores in the different domains show high intercorrelations, suggesting the dominance of a common underlying factor, e.g. general cognitive ability (see Luo et al. 2003; Rindermann, 2007). Financial literacy scores have also exhibited strong correlations of over $r = .80$ with the domains of mathematics and reading (OECD, 2014; OECD, 2024b). In situations where the same concept or domain is tested multiple times, such high correlations between test scores would indicate sufficient retest reliability in many measurement contexts.

Some studies on the three general domains in PISA (mathematics, reading and science) conclude that students' abilities in these domains indeed explain much less of their performance in the related PISA test items than their general cognitive or academic ability would (Pokropek et al., 2022a; Pokropek et al., 2022b). Pokropek et al. (2022a) attribute these results to the type of questions used in PISA, which attempt to test relatively broad competencies in various specific contexts. Other authors, however, emphasize the crucial contribution each PISA domain makes to testing students' performance and that the concept of general intelligence (or cognitive ability) should be reconsidered in an educational context (Baumert et al., 2009).

4.5 Discrepancies in financial literacy assessments

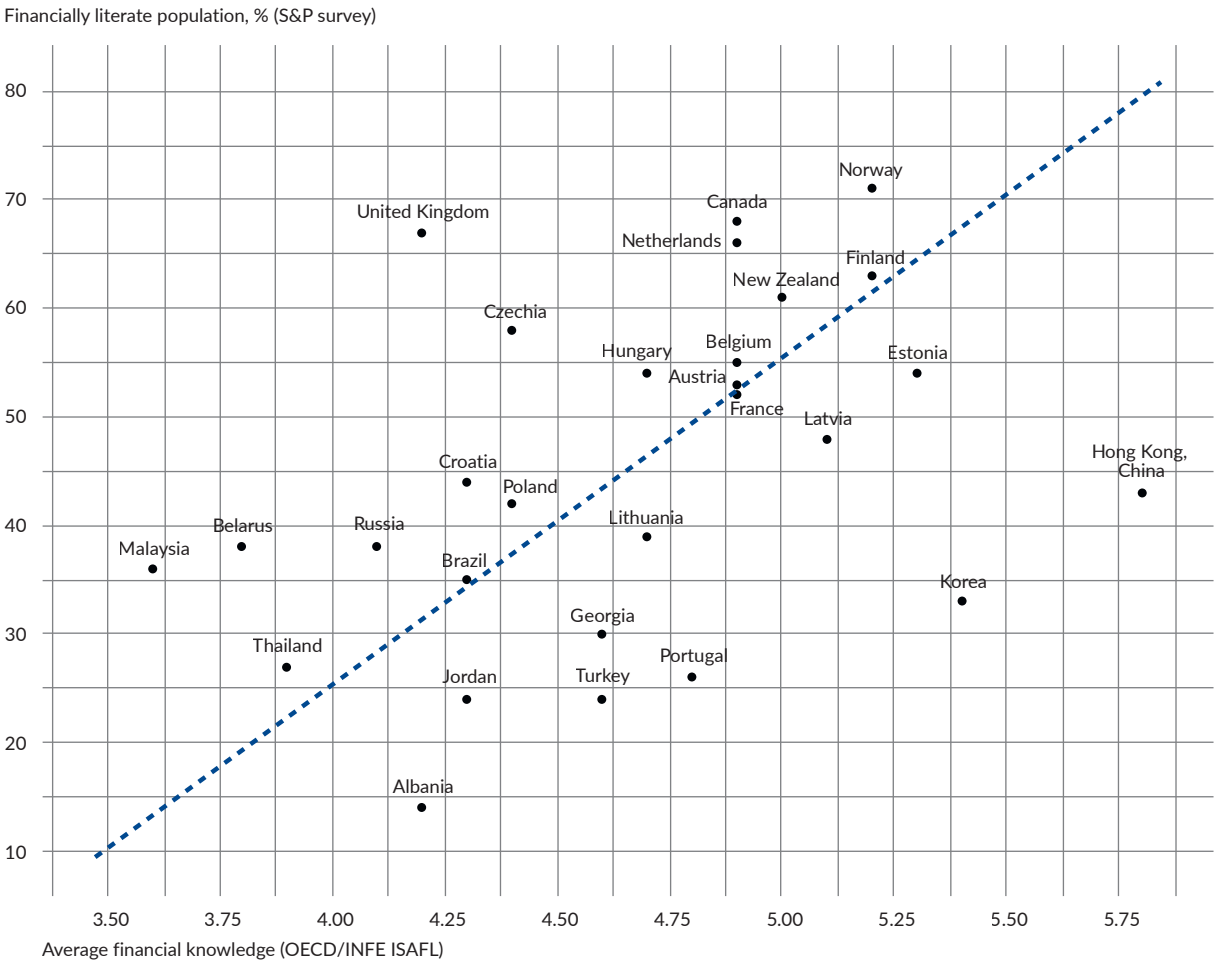
All of the financial literacy tests or questionnaires described above have been used in national or international studies to benchmark financial literacy or to serve as a basis for policy recommendations or development. However, as is evident, financial literacy assessments strongly depend on the underlying definitions and methodological approaches used. To illustrate potential discrepancies in financial literacy assessments related to these dependencies and other methodological differences, we briefly compare two international financial literacy surveys among adults that were conducted in the same 28 countries at around the same time between 2014 and 2016 – the OECD/INFE ISAFL (OECD, 2016b) and the S&P survey (Klapper et al., 2015). After comparing their results, we explore possible causes of the differences between them.

Thirty countries participated in the 2015 ISAFL, with most of the data being collected in 2015. Only some countries collected ISAFL data in 2014 or 2016. All in all, responses from 51,650 adults were collected in this ISAFL wave. Details on the survey's background and questionnaire are presented in subsection 4.2. The S&P survey took place in 2014 as part of the Gallup World Poll survey. It measured people's financial knowledge with regard to four basic financial concepts: risk diversification, inflation, numeracy (interest calculation) and compound interest. Data were collected in 143 countries from over 150,000 adults (Demirgüç-Kunt et al., 2015; Klapper et al., 2015). The questions used in the S&P survey are similar in format and content to the items introduced by Lusardi and Mitchell (see subsection 4.1) and to the financial knowledge questions used in the ISAFL, but they differ in focus and phrasing.

Chart 1 shows the results of the S&P survey and the ISAFL for those 28 countries that participated in both. We present the average financial knowledge score from the ISAFL as reported in OECD (2016b) and the percentage of participants that answered more than three of four questions correctly in the S&P survey as reported in Klapper et al. (2015). For the ISAFL, we show the financial knowledge score (as opposed to the total financial literacy score) as it corresponds more closely to the questions in the S&P survey.

Chart 1

OECD/INFE ISAFL knowledge score and S&P survey results



Source: OECD (2016b); Klapper et al. (2015).

Note: This chart shows countries' mean financial knowledge scores according to the OECD/INFE ISAFL and the share of financially literate persons in countries' total population according to the S&P survey. The dashed diagonal line represents a hypothetical perfect correlation. It connects the points of ± 2. 3 standard deviations from the mean of both variables.

As shown in chart 1, the two surveys did not find the same relative financial literacy levels in many countries. The correlation between countries' S&P percentages and countries' average ISAFL knowledge scores is $r = .41$ (rank correlation $r = .46$), despite the seemingly similar set of questions used in both surveys. Surprisingly, the correlation between the overall S&P survey percentage and the total ISAFL financial literacy score (also reported in OECD, 2016b), which includes attitudes and behaviors not covered in the S&P survey, is marginally higher with $r = .48$ (rank correlation $r = .47$). Neither correlation would indicate sufficient retest reliability in most measurement and assessment contexts.

The reasons for these differences are likely to be manifold. First, the target population of the S&P survey was the civilian population aged 15 and above (Demirgüç-Kunt et al., 2015), whereas that of the ISAFL was the adult population aged 18 to 79 (OECD, 2016b). Moreover, we cannot rule out that financial literacy levels actually changed in the time between the two surveys.

Second, differences in survey methodology are likely to have contributed to differences in results. As the ISAFL is conducted and adapted by separate commissioning bodies in the participating countries (e.g. central banks or ministries of finance), there may be significant differences in sampling, data collection and data weighting methods as well as in translations and country-specific adaptations of the questionnaire (OECD, 2016b). Data collection varied across countries also in the S&P survey, depending, for example, on survey participants having telephone access (Demirgüç-Kunt et al., 2015).

Third, the questionnaires themselves may have caused differences. While the knowledge-specific questions in the ISAFL cover similar topics as the S&P survey (inflation, interest, compound interest, risk diversification), the wording of questions differs considerably. For example, the ISAFL asks, "Suppose you put $ 100 into a 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 the first year, once the interest payment is made?" (OECD, 2016b, p. 20). The S&P survey asks, "Suppose you need to borrow 100 US dollars. Which is the lower amount to pay back: 105 US dollars or 100 US dollars plus three percent?" (Klapper et al., 2015, p. 6).

Finally, the way the final financial literacy levels are calculated may also affect survey results. While the OECD (2016b) presents average (mean) scores as the main result, Klapper et al. (2015) report the percentage of participants per country who correctly answer questions on "at least three out of the four financial concepts" (p. 7). Calculating population percentages above a certain score threshold as opposed to score means may significantly influence final rankings and may thus be another reason for differing results.

4.6 Methodological considerations on measuring financial literacy

Test instruments not only need to be based on a clear understanding of the measured concept (i.e. they must have construct validity; see Schuhen and Schürkmann, 2014), they also have to be tailored to the intended target group and use case. As shown above, financial literacy assessments thus vary widely. In some instances, financial literacy may also be operationalized as part of more general economic literacy (Kaiser et al., 2020, see also subsection 3.5) or may be further specified as digital financial literacy (Lyons and Kass-Hanna, 2021; see also subsection 3.4).

In a recent overview of financial literacy measurements, Haupt (2022) concludes that capturing the concept of financial literacy presents a major challenge, citing reviews that find common issues regarding the consistency of definitions and the coverage of financial literacy components (e.g. Huston, 2010; Remund, 2010; Rieger, 2020). The small set of knowledge questions that dominates the research field (see subsection 4.1) may indeed not be sufficient to cover the range of knowledge or other individual traits relevant to fully capturing the intended concept of financial literacy. As with all test instruments, challenges thus include ensuring adequate psychometric properties, i.e. sufficient validity and reliability (see e.g. Kimberlin and Winterstein, 2008), adequate difficulty (Knoll and Houts, 2012) and test fairness across subpopulations (De Clercq, 2019).

Concerning the statistical analysis of test instruments, the analysis framework based on item response theory (IRT; see De Ayala, 2013) has become a popular alternative to using classical test theory. In the IRT framework, the probability of responses is explicitly modeled on the basis of question (item) and participant characteristics. One of the simpler IRT models, the Rasch or one parameter logistic (1-PL) model, for example, is similar to a logistic regression. Computed on answers to a set of knowledge questions with only right or wrong options, a 1-PL model can be used to obtain difficulty estimates for each question and an ability estimate for each participant (Mair, 2018). The IRT framework also offers a host of tests and indicators to assess various quality criteria and assumptions of test instruments. For example, the fairness of questions across groups can be assessed in differential item functioning tests, i.e. tests of whether items behave similarly across different groups (e.g. De Clercq, 2019).

Despite the significant progress made both in the design and validation of test instruments, quantifying financial literacy relies on basic statistical assumptions that are not always made explicit. First and foremost, the dimensionality of the construct of financial literacy must be considered. Financial literacy could, for example, be regarded as a single, coherent construct or as a multidimensional construct that covers several components, each of which is to be measured separately and which are only combined at a later stage under certain conditions.

Moreover, one central assumption of most measurement instruments is the existence of a *latent* (unobservable) *construct* that manifests itself in observable and measurable *indicators*. For example, the correct responses to financial knowledge questions (the indicators) are interpreted as manifestations of financial literacy (the latent construct). This assumption is the basis of *reflective measurement*, which underlies the vast majority of tests and survey scales. Other approaches, in particular *formative measurement*, do not assume that indicators are manifestations of a latent construct but rather reverse the assumed causal direction by forming the construct through measurement itself (see Coltman et al., 2008). In some instances, such a formative approach might be better suited to assess a complex construct such as financial literacy (e.g. Warmath and Zimmerman, 2019).

No matter what approach is used, it is not possible to confirm the validity of a measurement instrument directly. Validity can only be inferred through the interrelationship of indicators or their correlations with other observable variables. All measurement instruments and analytical methods thus come with significant limitations that must be considered when interpreting assessment results.

Independently of the measurement instrument used, sampling, interview modes and weighting may also influence measurement results and should thus be deliberated and reported transparently. Indeed, from the initial understanding of financial literacy and the design of assessment instruments to methodological factors such as question phrasing, target population, sampling strategies, data collection methods, interviewer effects and statistical analysis, every stage of the assessment process can cause considerable disparity between measurement efforts (see subsection 4.5).

Researchers and evaluators should thus be cautious in their methodological choices and, if possible, use state-of-the-art measurement instruments, sampling strategies, interview methods and analysis frameworks. IRT, in particular, appears to be well-suited to analyze test instruments. As differences in methodological approaches will remain unavoidable, the transparent reporting of validation efforts and their results, e.g. reliability metrics, factor loadings and similar parameters, will facilitate comparisons between methods, measurements and, ultimately, evaluation results.

5 Determinants of financial literacy

Identifying determinants of financial literacy is the basis for designing evidence-based, targeted and effective financial education measures. In recent years, several comprehensive studies on this topic have synthesized and empirically tested findings from dozens of research articles exploring the relationship between financial literacy and specific variables (Klapper and Lusardi, 2020; Potrich et al., 2015; Zaimovic et al., 2023).

Based on this literature, the determinants of financial literacy can be categorized into four main groups: (1) sociodemographic factors, (2) socioeconomic factors, (3) macro-level factors and (4) financial education interventions. These determinants have various implications for policies aimed at enhancing financial literacy levels beyond financial education as they prompt considerations of structural inequality within society (O'Connor et al., 2019; Salignac et al., 2019). However, any interpretation of these findings should consider that determinants of financial literacy may vary considerably according to the specific definitions adopted in the respective studies (see also section 3).

5.1 Sociodemographic determinants

A prominent finding in the literature shows that, on average, men tend to exhibit higher levels of financial literacy than women, even after controlling for factors like income or employment status (Klapper and Lusardi, 2020; Potrich et al., 2018; Preston and Wright, 2019). However, gender roles influencing participation in economic decision-making may account for a considerable proportion of this gender gap (Cupák et al., 2018). Several researchers have suggested that the gender gap in financial literacy may not solely be due to an actual lack of financial knowledge among women but rather to a disparity in *confidence* when dealing with financial matters (Klapper and Lusardi, 2020; Lusardi and Mitchell, 2011). It has been noted that even in cases where women would have guessed the correct answer, they often refrain from responding, indicating a tendency to underestimate their level of financial literacy (Bucher-Koenen et al., 2021). Interestingly, the gender gap in financial literacy appears to exist already during adolescence (Driva et al., 2016), suggesting that socialization practices and cultural norms possibly contribute to instilling an overall more passive approach to money matters in girls from an early age (Agnew and Cameron-Agnew, 2015; Calamato, 2010; Rink et al., 2021).

In developed countries, financial literacy shows an inverted U-shape relationship with age, suggesting that both young and old people tend to have lower average financial literacy levels than middle-aged people (Boisclair et al., 2017; Kadoya and Khan, 2020; Klapper and Lusardi, 2020). Although cohort effects, particularly in single-country studies, might have a certain influence on such results, studies featuring cross-country comparisons and multivariate analyses point to a consistent age effect. Following the notion of "learning-by-doing," young people might simply have less experience in dealing with more sophisticated financial matters than older age groups (Frijns et al., 2014). Also, people's willingness to acquire financial knowledge is likely to increase with the amount of available resources they can use for making investments. This amount is typically highest at the end of their professional life, around the age of 60 to 65 (Lusardi et al., 2017). However, as people enter their 60s and beyond, they again tend to exhibit lower levels of financial knowledge (Agarwal et al., 2007; Finke et al., 2017).

A well-documented positive relationship exists between formal education levels and financial literacy, suggesting that people with higher educational attainment tend to understand fundamental financial concepts better. This holds true even when factors like income are considered (Boisclair et al., 2017; Garg and Singh, 2018; Kadoya and Khan, 2020; Klapper and Lusardi, 2020; Van Rooij et al., 2011). This might be due to the fact that higher exposure to formal education implies greater chances of attending courses where relevant financial knowledge is actively taught. Notably, students who have participated in economics, finance or business classes tend to score better in financial literacy tests (Akben-Selcuk and Altiok-Yilmaz, 2014; Paraboni et al., 2020). Moreover, more years of formal education, including mathematics and science classes, can improve people's numeracy, i.e. "the ability to access, use, interpret, and communicate mathematical information" (OECD, 2012a, p. 33). Numeracy, in turn, plays a crucial role in financial literacy (Cole et al., 2016; Darriet et al., 2022), suggesting that it might act as a mediator between formal education and financial literacy (Gan et al., 2019). Although substantive evidence is still lacking, Gan et al. (2019) also discuss the potential influence of increased social capital associated with high levels of education, which facilitates financial knowledge acquisition and exchange through larger social networks.

5.2 Socioeconomic determinants

Income and wealth have been found to be major determinants of financial literacy, as ceteris paribus people with higher incomes and/or greater financial assets tend to exhibit higher levels of financial knowledge (Almenberg and Säve-Söderbergh, 2011; Guiso and Jappelli, 2009; Kadoya and Khan, 2020; Klapper and Lusardi, 2020; Potrich et al., 2015).

Particularly as regards the relationship between financial literacy and wealth, there is empirical evidence of bidirectional causality. On the one hand, financial literacy is likely to facilitate wealth accumulation as it fosters prudent saving behavior and investment decisions (Lusardi and Mitchell, 2007; Van Rooij et al., 2012). On the other hand, people with higher incomes and greater wealth have a stronger incentive to acquire financial literacy as they can effectively use their financial knowledge to maximize their available capital and gain substantial returns by making better investment decisions (Lusardi et al., 2010; Monticone, 2010).

Conversely, people with limited assets and income might rationally choose to be ignorant toward certain types of financial knowledge and financial education measures since their primary focus is on meeting basic needs and they lack the financial resources to reap the benefits of thoroughly understanding concepts like inflation or compound interest (Lusardi et al., 2017; Son and Park, 2019).

5.3 Macro-level determinants

One main argument discussed in the literature concerns the relationship between financial literacy and the generosity of a country's welfare regime or public pension system. In countries where social security systems are highly developed – a situation which is usually associated with higher tax rates – individual responsibility for retirement planning or making emergency provisions is considerably reduced. As a result, people may have fewer incentives or even opportunities to acquire (a certain degree of) financial knowledge or behavior (see Almenberg and Säve-Söderbergh, 2011; Crossan et al., 2011; Fessler et al., 2020; Jappelli and Padula, 2015).

In countries like the USA, by contrast, where social security is less extensive, people have greater personal responsibility as they must *privately* provide for their retirement and hedge against various risks. Consequently, they face more financial decisions that may have severe consequences which, in turn, means that they can literally not afford to be ignorant of at least basic financial literacy if they want to avoid financial difficulties (Finlayson, 2009; Lusardi and Mitchell, 2011; Oehler and Werner, 2008).

Concerns about financial illiteracy and an increased emphasis on financial literacy are often linked to future challenges of sustaining public pension and social security systems, implying that people may need to assume more responsibility for their own financial well-being instead of relying on public systems (Almenberg and Säve-Söderbergh, 2011; Arrondel et al., 2014; Lusardi and Mitchell, 2011; Oehler and Werner, 2008). However, it is essential to note that financial literacy is not an end in itself but should ultimately contribute to financial well-being. While giving more responsibility to individuals by cutting social security benefits may possibly increase their financial literacy, it might have negative consequences for the financial well-being of large parts of the population, especially those with low incomes and low educational attainment who are prone to also lack financial literacy.

Experience from people's own history may also play a role in shaping their financial knowledge (Klapper and Lusardi, 2020). Some scholars report evidence that people who witnessed their countries undergo hyperinflation tend to understand the concept of inflation better than those who live in countries with stable prices (Hanke and Krus, 2013). Others report no such effect (Beckmann, 2013; Moure, 2016). This suggests that even if "inflation literacy" is enhanced in the short term by corresponding events, it declines again when the issue of inflation becomes less urgent.

Finally, culture and social context may also influence people's financial literacy. Klapper and Lusardi (2020) highlight the possible impact of cultural norms and attitudes related to managing money or incurring debt. Especially regarding people's risk propensity, long-term orientation and ease of discussing personal finance issues, cultural differences are prone to explain a certain degree of intercountry (De Beckker et al., 2020) and intracountry variation (Brown et al., 2018; Davoli and Rodriguez-Planas, 2020) in financial literacy levels.

5.4 The role of financial education

Financial education must be considered the main intervenable factor of financial literacy, i.e. the primary way to improve financial literacy through interventions. Indeed, Huston (2010) describes financial education as an "*input* intended to increase a person's human capital, specifically financial knowledge and/or application (i.e., financial literacy)" (p. 308, emphasis added), emphasizing those providing the input, i.e. the educators.

In contrast, the OECD defined financial education as "the *process* by which financial consumers/investors improve their understanding of financial products, concepts and risks and, through information, instruction and/or objective advice, develop the skills and confidence to become more aware of financial risks and opportunities, to make informed choices, to know where to go for help, and to take other effective actions to improve their financial well-being" (OECD, 2005, p. 13, emphasis added). This definition highlights that financial education can also be considered an active process by which people acquire financial literacy.

One subject of discussion is the *content* of financial education measures, which, as some authors claim, should go beyond personal finance. Retzmann and Seeber (2016) e.g. argue that "being financially educated means more than being financially literate and should be seen as a proper subset of economic education" (p. 9). This understanding also refers to financial education as an "end," rather than an input or a process. Others criticize a narrow understanding of financial education as a form of "consumer training" and want financial education to contribute to the development of a "critical reflective-reflexive capacity to make informed choices in life" (Baumann and Hall, 2012, p. 513).

While it is evident that financial education influences financial knowledge, there has been mixed evidence regarding its impact on actual financial behaviors (Fernandes et al., 2014; Kaiser and Menkhoff, 2017). This "knowledge-behavior gap" can be deemed highly problematic as it is only through decision-making, actions and behaviors that financial literacy has the potential to contribute to financial well-being. Moreover, any impact may be considerably time sensitive. Fernandes et al. (2014) find in their analysis that the effect of financial education measures wears off rather quickly, and they thus conclude that financial education could be effective when it takes place "just in time" and is tied to specific decisions or behaviors.

Relatedly, there is little agreement on whether financial education should be primarily about teaching knowledge that is later applied in a financial decision-making context or whether it should try to directly foster prudent financial behaviors (Bartholomae and Fox, 2022). The World Bank, for example, has been open toward direct, behavioral approaches (see subsection 2.2). Indeed, combinations of conventional financial education and direct behavioral interventions ("nudging") may prove particularly effective (e.g. García and Vila, 2020).

Given the limited comparability and validity of studies (see Willis, 2022), drawing a definite conclusion on the effectiveness of financial education will remain challenging. Nevertheless, more recent meta studies provided evidence that financial education does have an impact on people's financial behavior (Kaiser et al., 2022). Overall, there is indeed growing causal evidence that financial education and related methods positively affect behavior in certain settings, particularly large-scale school programs and "innovative" methods for adults (Kaiser and Lusardi, 2024).

As to the causal mechanisms that translate financial literacy into financial behavior, psychological traits, such as self-efficacy in financial matters (see Goyal and Kumar, 2021; Lučić et al., 2023), are likely to play an important role. However, the causal mechanisms underlying the relationship between financial education and financial behavior are still not fully understood (see Kaiser and Lusardi, 2024). Ultimately, just like financial literacy, financial education itself represents a complex and highly heterogenous concept.[1]

6 Effects of financial literacy

6.1 Financial behavior

Many studies on financial literacy focus on financial knowledge and its effects on financial behaviors such as making investments or borrowing. As financial behaviors are sometimes included in the term "financial literacy," e.g. in the OECD/INFE definition, the distinction between components of financial literacy and effects of financial literacy has been considerably blurred. Nevertheless, studies on the connection between financial literacy (in terms of financial knowledge) and the associated financial behaviors can be considered crucial evidence of the causal mechanisms that lead to financial well-being in the long run.

Indeed, there is a growing body of research indicating the importance of financial knowledge and its positive effects on various aspects of personal finance. One of the earliest studies conducted by Hilgert et al. (2003) demonstrated a strong link between having sound financial knowledge and engaging in good financial practices, including managing cash flow, handling credit, saving and investing. Subsequent research has further confirmed this correlation, showing that financial literacy is associated with retirement planning as well as accumulating savings and wealth (Ameriks et al., 2003; Behrman et al., 2012; Hung et al., 2009; Lusardi, 2003; Lusardi and Mitchell, 2007; Van Rooij et al., 2012).

Moreover, a person's level of financial knowledge appears to be predictive of various investment behaviors, such as participating in the stock market (Christelis et al., 2010; Van Rooij et al., 2011), achieving higher risk-adjusted investment returns (Clark et al., 2017; Van Rooij et al., 2011), selecting low-fee investment portfolios (Hastings et al., 2011) and engaging in better diversification and more frequent stock trading (Graham et al., 2009). People with higher financial knowledge are also less susceptible to exploitation or deception (Andreou and Philip, 2018; Balloch et al., 2015; de Bassa Scheresberg, 2013; Campbell et al., 2011; Deevy et al., 2012; Lusardi and Mitchell, 2011). In contrast, low levels of financial literacy are associated with negative credit behaviors such as accumulating debt (Andreou and Philip, 2018; Lusardi et al., 2020; Lusardi and Tufano, 2009) and resorting to high-cost borrowing (Lusardi and Tufano, 2009).

Overall, financial knowledge appears to be an important predictor of beneficial financial behaviors. However, the results presented above are exclusively based on correlational studies and can thus not serve as causal evidence. Other factors, such as disposable income, could influence both financial knowledge and financial behavior. Financial knowledge may also be the result of behavior itself, where financial knowledge increases through learning-by-doing or other mechanisms.

6.2 Financial resilience and financial vulnerability

According to the OECD (2021b), financial resilience refers to "the ability of individuals or households to resist, cope and recover from negative financial shocks" (p. 35). Salignac et al. (2019) define financial resilience more specifically "as an individual's ability to access and draw on internal capabilities and appropriate, acceptable and accessible external resources and supports in times of financial adversity" (p. 21). Financial literacy, as an internal capability, may thus help people develop effective budgeting and

[1] Further details on financial education measures and their effectiveness go beyond the scope of this paper but will be explored in other issues of this series.

saving habits and cultivate a mindset of preparedness, eventually enabling them to better cope with events that negatively affect their personal financial situation, such as job loss or financial shocks like the need to repair or replace necessary appliances.

Sometimes, instead of (or in distinction to) financial resilience, the term "financial vulnerability" or similar terms such as "financial fragility" (Lusardi et al., 2011) or "economic insecurity" (Hacker, 2018) are used to describe a person's *likelihood to fall into financial hardship* (O'Connor et al., 2019). Thus, financial vulnerability does not (necessarily) imply that poverty or a state of financial hardship are already present. High-income earners, for example, may have an expensive lifestyle that prevents them from setting money aside to compensate for future financial shocks. Conversely, people with lower incomes can be very economical and forward looking and therefore able to build the necessary financial buffers. Despite the apparent similarities between financial vulnerability and financial resilience, it remains unclear whether the former can be regarded as the mere opposite of the latter, i.e. whether high vulnerability equals low financial resilience and vice versa, or whether financial resilience, in fact, requires more than the relative absence of financial vulnerability.

Several studies have identified indicators that can be used to quantify current levels of financial resilience or financial vulnerability by considering the potential impact of financial shocks (see e.g. Bialowolski et al., 2022; Mainwaring; 2020; OECD, 2020a; Ratcliff et al., 2022) or the ability to cope with a sudden fall in income or an unexpected expenditure (Financial Resilience Task Force, 2019). On a general level, studies from around the world 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; Lyons et al., 2019). Some evidence also indicates that financial literacy might be able to strengthen financial resilience and reduce financial vulnerability (Anderloni et al., 2012; Andreou et al., 2023; Clark et al., 2021; Lusardi et al., 2021).

However, it is important to acknowledge that financial resilience or financial vulnerability are heavily influenced by external factors that are largely beyond a person's immediate control, including wealth, income, employment opportunities or social support systems (Anderloni et al., 2012; Lusardi et al., 2011; Salignac et al., 2019). Consequently, low financial resilience cannot be attributed solely to a lack of financial literacy without considering prevalent societal and interpersonal disparities concerning income, assets, wealth and social capital.

6.3 Financial well-being

The recent shift from a primary focus on financial literacy to a broader concept of *financial well-being* marks a significant evolution in the field of financial literacy. For many well-known organizations and initiatives active in financial education, such as PISA (OECD, 2012d), OECD/INFE (2020) and the CFPB (CFPB, 2015), financial well-being now represents the overarching goal of their financial education efforts. In parallel, national strategies are shifting their focus toward financial well-being, replacing their previous emphasis on financial literacy (OECD, 2022a).

The new focus on financial well-being acknowledges that people's financial lives are not solely shaped by financial literacy but are instead influenced by a multitude of other determinants (e.g. Warmath, 2022), including contextual and structural factors (Bowman et al., 2017). For instance, a family with strong financial literacy might still face financial challenges due to external factors like high costs of living or local economic conditions. This example highlights the need for a more comprehensive approach to financial literacy and financial well-being.

There is no universally accepted definition of financial well-being (Brüggen et al., 2017; Riitsalu and Van Raaij, 2022). Some studies attempted to define financial well-being from the perspective of consumers or financial professionals. A study by the CFPB (2015) explored the meaning of financial well-being

through interviews in the United States, arriving at the definition of financial well-being as "a state of being wherein a person can fully meet current and ongoing financial obligations, can feel secure in their financial future, and is able to make choices that allow enjoyment of life" (p. 18).

Applying a similar approach, Kempson et al. (2017) reanalyzed focus group data previously published by the World Bank (Kempson et al., 2013; Holzmann et al., 2013) and the UK Financial Service Authority (Atkinson et al., 2006; Personal Finance Research Centre, 2005). Based on their analysis, they describe financial well-being as "the extent to which someone is able to meet all their current commitments and needs comfortably, and has the financial resilience to maintain this in the future" (Kempson et al., 2017, p. 19).

Another strand of definitions has emerged from literature reviews, including one proposed by Brüggen et al. (2017), who define financial well-being as an individual's "perception of being able to sustain current and anticipated desired living standards and financial freedom" (p. 229). Financial well-being is also related to various other terms, including "financial satisfaction," "financial wellness," "economic well-being" or "financial efficacy," and is frequently used as a synonym for financial health (Fu, 2020).

An ongoing debate revolves around the question of whether financial well-being should be assessed through objective factors, subjective factors or a combination of both (Brüggen et al., 2017; Riitsalu and Van Raaij, 2022). Objective financial well-being comprises quantifiable aspects such as income, expenses, savings and debt. Historically, financial well-being has often been used as a synonym for income, representing an objective factor (Sorgente and Lanz, 2019).

In contrast, subjective financial well-being reflects a person's perception of their financial situation (Salignac et al., 2019). Here, objective measures such as income may serve as determinants of financial well-being but are not considered part of the concept itself (Warmath, 2022). In the current discourse, the notion that financial well-being is purely objective is rejected. However, it remains a matter of debate whether financial well-being encompasses both objective and subjective dimensions (Kempson et al., 2017; Sorgente and Lanz, 2019) or whether it is solely subjective in nature (Brüggen et al., 2017; Fan and Henager, 2022; Riitsalu and Van Raaij, 2022).

Proponents of a purely subjective understanding of financial well-being consider it to be influenced by personal factors such as social reference groups and personal preferences (Brüggen et al., 2017). Proponents of a combined approach argue that it offers a more balanced perspective and is less susceptible to distortions (Tenney and Kalenkoski, 2019). Research also consistently highlights that financial well-being encompasses both current and future elements (Fan and Henager, 2022). While most studies combine present and future aspects into one factor, some studies suggest that current and future well-being may be distinct concepts influenced by different determinants (Netemeyer et al., 2018; Riitsalu and Van Raaij, 2022).

Going beyond the concept of financial well-being itself, researchers have made some efforts toward developing a structured understanding of the factors contributing to it. Their studies are mostly empirical and sometimes theoretical in nature (Goyal and Kumar, 2021). The prevailing trend in most studies is to list factors that are empirically linked to financial well-being without delving into an in-depth exploration of the underlying mechanisms. Some recent studies, however, place more emphasis on the theoretical basis of these mechanisms (Bowman et al., 2017; Lučić et al., 2023).

Based on current literature[2], determinants of financial well-being can be broadly categorized as:

- *contextual/environmental factors*: economic conditions, income and wealth in particular, cultural norms and policy environments;
- *financial attitudes and behaviors*: individual approaches to finance management, such as spending habits and saving attitudes;

[2] ANZ Bank New Zealand Limited (2021); Atkinson and Messy (2012); Brüggen et al. (2017); CFPB (2015); Fan and Henager (2022); Goyal and Kumar (2021); Kempson et al. (2017); Lučić et al. (2023); Xiao et al. (2022).

- *financial knowledge and skills*: financial literacy playing a critical role in shaping financial decisions and behaviors;
- *personal traits*: personal characteristics such as resilience and adaptability.

While financial literacy has been consistently shown to have an indirect influence on financial well-being through financial behaviors, contextual factors such as income and wealth are its most influential determinants by far. A recent empirical study (ANZ Bank New Zealand Limited, 2021) found that socioeconomic factors account for 55 % of variations in financial well-being, money management behaviors for 21 % and behavioral traits for 14 %. Financial attitudes and personal traits primarily have an indirect impact on financial well-being through their influence on people's financial behaviors (Çera et al., 2021; Hwang and Park, 2023).

Although financial well-being is today regarded as the overarching goal of financial literacy, the lack of a common understanding of the concepts themselves and of a theoretical basis restricts the ability to conduct meaningful analyses of their interplay. While financial literacy has been demonstrated to have an indirect effect on financial well-being trough people's financial behavior, further research is still required to determine what type of financial literacy and financial education interventions effectively contribute to financial well-being or, on a larger scale, to societal financial stability and crisis resilience.

7 Conclusion

This paper aims to provide a suitable starting point for navigating the diverse research and policy landscape of financial literacy. To this end, we explore the concept of financial literacy from six perspectives, ranging from its historical origins and evolution to the promoting organizations, definitions, measurement approaches, determinants and, finally, to its outcomes and effects. We find that financial literacy can be considered the core concept of a research and policy field that is, in essence, concerned with people's ability to improve their financial outcomes. Unsurprisingly, however, we neither find a universal definition of financial literacy nor one common methodological approach to measuring it nor conclusive evidence of its causal relevance for financial well-being and similar effects.

We find that the field has progressed substantially in recent years, with evidence-based approaches having emerged just around the turn of the millennium. Despite the leading role of influential (international) organizations in promoting financial literacy, definitions of financial literacy remain heterogeneous across countries, policymaking bodies and research. Based on various popular definitions of financial literacy and closely related concepts, we find five aspects in which definitions differ with regard to fundamental theoretical assumptions, namely: (1) goals, (2) traits considered, (3) inclusion of observable behaviors, (4) thematic focus and (5) inclusion of environmental and context factors. We recommend that researchers, policymakers and educators consider and report on the definitions and fundamental assumptions they adopt to minimize ambiguity and promote comparability of both interventions and research results.

The heterogeneity of underlying assumptions and concepts becomes strikingly apparent in the different approaches to measuring financial literacy. Although many assessments still rely on a few short knowledge questions, others employ much larger sets of questions that cover other components such as behaviors and attitudes. We find that different methodological approaches, such as in sampling or statistical analyses, can considerably influence the results of financial literacy assessments. We thus recommend increasing efforts to reduce the sampling bias in surveys, comprehensive validations of test instruments and the use of advanced statistical frameworks (item response theory in particular) to further advance the measurement of financial literacy and produce useful and comparable measurements.

Finally, the causal relationships between financial education, financial literacy and financial well-being remain ambiguous. Studies report significant differences in financial literacy depending on sociodemographic, socioeconomic and macro-level determinants and show associations both between financial

knowledge and financial behaviors and between financial literacy and financial resilience and financial well-being. However, a clear causal link between financial education and financial behaviors, let alone financial well-being or societal financial stability, has yet to be established. More research and evaluation are therefore needed to ascertain what type of financial education and what type of financial literacy affect people's lives in what way.

Given the striking diversity and the interdisciplinary nature of financial literacy-related perspectives and methods, we also argue for establishing some level of consensus on terminology, methodological approaches and reporting standards. While diversity has clearly enriched the discourse, we expect that critically reflecting on the underlying assumptions of concepts and making transparent theoretical and methodological choices can only improve the comparability of interventions and research results. We also call for increased collaboration across institutions and heightened methodological standards in evaluation efforts and large-scale assessments to ensure coherent evidence for effective policymaking.

This paper is restricted in scope and therefore characterized by many omissions. It primarily focuses on quantitative evaluation and research methods and does not discuss qualitative or mixed-method approaches. We mainly explore English-language and international literature and concentrate on definitions and approaches applied by the most prominent (international) organizations in the field, which necessarily means that many authors and organizations have not been considered. We only briefly address concepts beyond the concept of financial literacy, the concept of financial education, in particular. Indeed, our focus on the core concept of financial literacy and its most prominent definitions and approaches aims to provide a structured, accessible overview that explores key aspects of the concept and facilitates informed theoretical and methodological choices in both research and policymaking.

References

Ackermann, N. and F. Eberle. 2016. Financial Literacy in Switzerland. In: Aprea, C., E. Wuttke, K. Breuer, N. K. Koh, P. Davies, B. Greimel-Fuhrmann and J. S. Lopus (eds.). International Handbook of Financial Literacy. Springer. 341–356.

Agarwal, S., J. C. Driscoll, X. Gabaix and D. Laibson. 2007. The age of reason: Financial decisions over the lifecycle. NBER Working Paper Series 13191. National Bureau of Economic Research. https://www.nber.org/system/files/working_papers/w13191/w13191.pdf

Agnew, S. and T. Cameron-Agnew. 2015. The influence of consumer socialisation in the home on gender differences in financial literacy. In: International Journal of Consumer Studies 39(6). 630–638.

Akben-Selcuk, E. and A. Altiok-Yilmaz. 2014. Financial literacy among Turkish college students: The role of formal education, learning approaches, and parental teaching. In: Psychological Reports 115(2). 351–371.

Almenberg, J. and J. Säve-Söderbergh. 2011. Financial literacy and retirement planning in Sweden. In: Journal of Pension Economics & Finance 10(4). 585–598.

Ameriks, J., A. Caplin and J. Leahy. 2003. Wealth accumulation and the propensity to plan. In: The Quarterly Journal of Economics 118(3). 1007–1047.

Anderloni, L., E. Bacchiocchi and D. Vandone. 2012. Household financial vulnerability: An empirical analysis. In: Research in Economics 66(3). 284–296.

Andreou, P. C., S. Anyfantaki and A. Atkinson. 2023. Financial literacy for financial resilience: Evidence from Cyprus during the pandemic period. In: Cyprus Economic Policy Review 17(1). 27–54.

Andreou, P. C. and D. Philip. 2018. Financial knowledge among university students and implications for personal debt and fraudulent investments. In: Cyprus Economic Policy Review 12(2). 3–23.

ANZ Bank New Zealand Limited. 2021. Financial wellbeing: A survey of adults in New Zealand. ANZ Bank New Zealand Limited. https://www.anz.com.au/content/dam/anzcomau/documents/pdf/aboutus/esg/financial-wellbeing/anz-nz-adult-financial-wellbeing-survey-2021.pdf

Aprea, C., E. Wuttke, K. Breuer, N. K. Koh, P. Davies, B. Greimel-Fuhrmann and J. S. Lopus (eds.). 2016. International Handbook of Financial Literacy. Springer.

Arbeiterkammer Wien (Chamber of Labour, Vienna). 2023. AK-TV. https://tv.arbeiterkammer.at

Arrondel, L., M. Debbich and F. Savignac. 2014. Financial Literacy and Financial Planning in France. Banque de France Working Paper 465. Banque de France.

Arrondel, L., M. Haupt, M. J. Mancebón, G. Nicolini, M. Wälti and J. Wiersma. 2022. Financial Literacy and Financial Education in Western Europe. In: Nicolini, G. and B. J. Cude (eds.). The Routledge Handbook of Financial Literacy. Routledge. 363–381.

Atkinson, A. and F. A. Messy. 2012. Measuring financial literacy: Results of the OECD/International Network on Financial Education (INFE) pilot study. OECD. https://doi.org/10.1787/5k9csfs90fr4-en

Atkinson, A., S. McKay, E. Kempson and S. Collard. 2006. Levels of Financial Capability in the UK: Results of a baseline survey. Financial Services Authority. https://www.bristol.ac.uk/media-library/sites/geography/migrated/documents/pfrc0602.pdf

Baartman, L. K., T. J. Bastiaens, P. A. Kirschner and C. P. Van der Vleuten. 2007. Evaluating assessment quality in competence-based education: A qualitative comparison of two frameworks. In: Educational research review 2(2). 114–129.

Bacon, F. 1596 [2018]. The Essay of Expense. In: The Essays or Counsels, Civil and Moral. Project Gutenberg. 79–81. https://www.gutenberg.org/files/56463/56463-h/56463-h.htm#Page_179

Balloch, A., A. Nicolae and D. Philip. 2015. Stock market literacy, trust, and participation. In: Review of Finance 19(5). 1925–1963.

Barnum, P. T. 1880 [2013]. The Art of Money Getting. Project Gutenberg. https://www.gutenberg.org/files/8581/8581-h/8581-h.htm

Barrett, C. 2023. Grandparents: give the gift of investment education. FT Financial Literacy and Inclusion Campaign. Financial Times. https://www.ft.com/jisa

Bartholomae, S. and J. J. Fox. 2022. Overview of Financial Education. In: Nicolini, G. and B. J. Cude (eds.). The Routledge Handbook of Financial Literacy. Routledge. 173–186.

Baumann, C. and T. Hall. 2012. Getting Cinderella to the ball: putting education at the heart of financial education: A conceptual exploration of the potential role of education within financial education. In: International Journal of Consumer Studies 36(5). 508–514.

Baumert, J., O. Lüdtke, U. Trautwein and M. Brunner. 2009. Large-scale student assessment studies measure the results of processes of knowledge acquisition: Evidence in support of the distinction between intelligence and student achievement. In: Educational Research Review 4(3). 165–176.

Beckmann, E. 2013. Financial literacy and household savings in Romania. In: Numeracy 6(2). 9.

Behrman, J. R., O. S. Mitchell, C. K. Soo and D. Bravo. 2012. How financial literacy affects household wealth accumulation. In: American Economic Review 102(3). 300–304.

Bialowolski, P., A. Cwynar and D. Weziak-Bialowolska. 2022. The role of financial literacy for financial resilience in middle-age and older adulthood. In: International Journal of Bank Marketing 40(7). 1718–1748.

Boisclair, D., A. Lusardi and P.-C. Michaud. 2017. Financial literacy and retirement planning in Canada. In: Journal of Pension Economics & Finance 16(3). 277–296.

Bongini, P., P. Iannello, E. E. Rinaldi, M. Zenga and A. Antonietti. 2018. The challenge of assessing financial literacy: alternative data analysis methods within the Italian context. In: Empirical Research in Vocational Education and Training 10(1). 1–22.

Bowman, D., M. Banks, G. Fela, R. Russell and A. de Silva. 2017. Understanding Financial Wellbeing in Times of Insecurity. Working Paper. Brotherhood of St Laurence. https://library.bsl.org.au/bsljspui/bitstream/1/9423/1/Bowman_etal_Understanding_financial_wellbeing_2017.pdf

Brown, M., C. Henchoz and T. Spycher. 2018. Culture and financial literacy: Evidence from a within-country language border. In: Journal of Economic Behavior & Organization 150. 62–85.

Brüggen, E. C., J. Hogreve, M. Holmlund, S. Kabadayi and M. Löfgren. 2017. Financial well-being: A conceptualization and research agenda. In: Journal of Business Research 79. 228–237.

Bucher-Koenen, T., R. J. Alessie, A. Lusardi and M. Van Rooij. 2021. Fearless woman: Financial literacy and stock market participation. NBER Working Paper Series 28723. National Bureau of Economic Research.

Calamato, M. P. 2010. Learning financial literacy in the family. Master Thesis. San Jose State University.

Cameron, M. P. and P. Wood. 2016. The policy context for financial education in New Zealand. In: Aprea, C., E. Wuttke, K. Breuer, N. K. Koh, P. Davies, B. Greimel-Fuhrmann and J. S. Lopus (eds.). International Handbook of Financial Literacy. Springer. 179–192.

Campbell, J. Y., H. E. Jackson, B. C. Madrian and P. Tufano. 2011. Consumer financial protection. In: Journal of Economic Perspectives 25(1). 91–114.

Çera, G., K. A. Khan, A. Mlouk and T. Brabenec. 2021. Improving financial capability: the mediating role of financial behaviour. In: Economic Research-Ekonomska Istraživanja 34(1). 1265–1282.

Child, L. 1828 [2020]. The American Frugal Housewife. Project Gutenberg. https://www.gutenberg.org/cache/epub/13493/pg13493-images.html

Child & Youth Finance International (CYFI). 2019. Brokering Collaborative Systems Change. Child & Youth Finance International. https://issuu.com/childfinanceinternational/docs/cyfi_brokering_collaborative_system/1?e=7128000/67885967

Christelis, D., T. Jappelli and M. Padula. 2010. Cognitive abilities and portfolio choice. In: European Economic Review 54(1). 18–38.

Clark, R. L., A. Lusardi and O. S. Mitchell. 2017. Financial knowledge and 401(k) investment performance: a case study. In: Journal of Pension Economics & Finance 16(3). 324–347.

Clark, R. L., A. Lusardi and O. S. Mitchell. 2021. Financial fragility during the COVID-19 pandemic. AEA Papers and Proceedings 111. American Economic Association.

Clason, G. S. 1926. The Richest Man in Babylon. https://upload.wikimedia.org/wikipedia/commons/e/e7/The_Richest_Man_In_Babylon.pdf

Cole, S., A. Paulson and G. K. Shastry. 2016. High school curriculum and financial outcomes: The impact of mandated personal finance and mathematics courses. In: Journal of Human Resources 51(3). 656–698.

Collins, J. M. 2011. Improving Financial Literacy: The Role of Nonprofit Providers. In: Mitchell, O. S. and A. Lusardi (eds.). Financial literacy: Implications for retirement security and the financial marketplace. Oxford University Press. 101–115.

Coltman, T., T. M. Devinney, D. F. Midgley and S. Venaik. 2008. Formative versus reflective measurement models: Two applications of formative measurement. In: Journal of Business Research 61(12). 1250–1262.

Comisión Nacional del Mercado de Valores, Banco de España and Ministerio de Asuntos Económicos y Transformación Digital. 2022. Financial Education Plan 2022–2025. https://www.cnmv.es/DocPortal/Publicaciones/PlanEducacion/plan-educa-financiera-2022-2025-en.pdf

Compen, B., K. De Witte and W. Schelfhout. 2019. The role of teacher professional development in financial literacy education: A systematic literature review. In: Educational Research Review 26. 16–31.

Consumer Financial Protection Bureau (CFPB). 2015. Financial Well-being: The Goal of Financial Education. https://files.consumerfinance.gov/f/201501_cfpb_report_financial-well-being.pdf

Crossan, D., D. Feslier and R. Hurnard. 2011. Financial literacy and retirement planning in New Zealand. In: Journal of Pension Economics & Finance 10(4). 619–635.

Cude, B. J. 2022. Defining financial literacy. In: Nicolini, G. and B. J. Cude (eds.). The Routledge Handbook of Financial Literacy. Routledge. 5–17.

Cupák, A., P. Fessler, A. Schneebaum and M. Silgoner. 2018. Decomposing gender gaps in financial literacy: New international evidence. In: Economics Letters 168. 102–106.

Darriet, E., M. Guille and J.-C. Vergnaud. 2022. Financial Literacy and Numeracy. In: Nicolini, G. and B. J. Cude (eds.). The Routledge Handbook of Financial Literacy. Routledge. 96–109.

Davoli, M. and N. Rodriguez-Planas. 2020. Culture and adult financial literacy: Evidence from the United States. In: Economics of Education Review 78. 102013.

De Ayala, R. J. 2013. The Theory and Practice of Item Response Theory. Guilford Press.

de Bassa Scheresberg, C. de. 2013. Financial literacy and financial behavior among young adults: Evidence and implications. In: Numeracy 6(2). 5.

De Beckker, K., K. De Witte and G. Van Campenhout. 2020. The role of national culture in financial literacy: Cross-country evidence. In: Journal of Consumer Affairs 54(3). 912–930.

De Clercq, B. 2019. A comparative analysis of the OECD/INFE financial knowledge assessment using the Rasch model. In: Empirical Research in Vocational Education and Training 11(1). 1–29.

Deevy, M., S. Lucich and M. Beals. 2012. Scams, schemes & swindles. Financial Fraud Research Center. https://longevity.stanford.edu/wp-content/uploads/2017/01/Scams-Schemes-Swindles-FINAL-On-Website.pdf

Demirgüç-Kunt, A., L. F. Klapper, D. Singer and P. Van Oudheusden. 2015. The global findex database 2014: Measuring financial inclusion around the world. Policy Research Working Paper 7255. World Bank Group.

Dinwoodie, J. T. 2010. Ignorance is not bliss: Financial illiteracy, the mortgage market collapse, and the global economic crisis. In: University of Miami Business Law Review 18. 181.

Drisko, J. W. 2014. Competencies and their assessment. In: Journal of Social Work Education 50(3). 414–426.

Driva, A., M. Lührmann and J. Winter. 2016. Gender differences and stereotypes in financial literacy: Off to an early start. In: Economics Letters 146. 143–146.

Eberle, F., S. Schumann, E. Kaufmann, A. Jüttler and N. Ackermann. 2016. Modellierung und Messung wirtschaftsbürgerlicher Kompetenz von kaufmännischen Auszubildenden in der Schweiz und in Deutschland. In: Oser, F., M. Landenberger and K. Beck (eds.). Technologiebasierte Kompetenzmessung in der beruflichen Bildung: Ergebnisse aus der BMBF-Förderinitiative ASCOT. Wirtschaft – Beruf – Ethik, Bd 32. Bielefeld: wbv. 93–117.

Erste Bank und Sparkasse. 2023. Coins, cash und keine Ahnung? Hier lernen Erwachsene, Kinder und Jugendliche alles rund ums Geld. https://www.sparkasse.at/sgruppe/privatkunden/konto-karten/vorteile-services/finanzbildung

Europäisches Verbraucherzentrum Österreich (European Consumer Centre Austria). 2023a. Coaching rip-off still going strong. https://europakonsument.at/en/coaching-rip-still-going-strong/64790

Europäisches Verbraucherzentrum Österreich (European Consumer Centre Austria). 2023b. Fast cash through coaching? https://europakonsument.at/en/fast-cash-through-coaching/5781

European Union and OECD. 2022. Financial competence framework for adults in the European Union. European Union and OECD. https://www.oecd.org/en/publications/financial-competence-framework-for-adults-in-the-european-union_510f133c-en.html

European Union and OECD. 2023. Financial competence framework for children and youth in the European Union. European Union and OECD. https://finance.ec.europa.eu/publications/commission-and-oecd-infe-publish-joint-framework-children-and-youth_en

Fan, L. and R. Henager. 2022. A structural determinants framework for financial well-being. In: Journal of Family and Economic Issues 43(2). 415–428.

Faulkner, A. 2015. A systematic review of financial literacy as a termed concept: More questions than answers. In: Journal of Business & Finance Librarianship 20(1–2). 7–26.

Faulkner, A. 2022. Financial Literacy around the World: What we can learn from the national strategies and contexts of the top ten most financially literate nations. In: The Reference Librarian 63(1–2). 1–28.

Fernandes, D., J. G. Lynch Jr. and R. G. Netemeyer. 2014. Financial literacy, financial education, and downstream financial behaviors. In: Management Science 60(8). 1861–1883.

Fessler, P., M. Silgoner and R. Weber. 2020. Financial knowledge, attitude and behavior: evidence from the Austrian Survey of Financial Literacy. In: Empirica 47. 929–947.

Financial Consumer Agency of Canada. 2021. Make Change that Counts: National Financial Literacy Strategy 2021-2026. Financial Consumer Agency of Canada. https://www.canada.ca/en/financial-consumer-agency/programs/financial-literacy/financial-literacy-strategy-2021-2026.html

Financial Resilience Task Force. 2019. Measuring Household Financial Resilience. Financial Capability Strategy for the UK. https://masassets.blob.core.windows.net/fincap-cms/files/000/000/486/original/Financial-resilience-TaskForce-Report_29.10.19.pdf

Finke, M. S., J. S. Howe and S. J. Huston. 2017. Old age and the decline in financial literacy. In: Management Science 63(1). 213–230.

Finlayson, A. 2009. Financialisation, financial literacy and asset-based welfare. In: The British Journal of Politics and International Relations 11(3). 400–421.

Franklin, B. 1736 [1794]. Necessary hints to those that would be rich. In: The Works of the Late Dr. Benjamin Franklin Consisting of His Life Written by Himself Together with Essays Humorous, Moral, & Literary, Chiefly in the Manner of the Spectator. New York: Tiebout & Obrian. 33.

Frenken R. and D. P. R. Folcher (eds.). 2020. Financial Literacy Playbook for Europe. European Banking Federation. https://www.ebf.eu/wp-content/uploads/2020/11/EBF-Financial-Literacy-Playbook-for-Europe.pdf

Fridrich, C. 2019. Socio-economic education in the school subject 'geography and economics education' in Austria: history, trends, issues and attitudes. In: International Journal of Pluralism and Economics Education 10(4). 383–400.

Frijns, B., A. Gilbert and A. Tourani-Rad. 2014. Learning by doing: The role of financial experience in financial literacy. In: Journal of Public Policy 34(1). 123–154.

Frühauf, F. and T. Retzmann. 2016. Financial Literacy in Germany. In: Aprea, C., E. Wuttke, K. Breuer, N. K. Koh, P. Davies, B. Greimel-Fuhrmann and J. S. Lopus (eds.). International Handbook of Financial Literacy. Springer. 263–276.

Fu, J. 2020. Ability or opportunity to act: What shapes financial well-being? In: World Development 128. 104843.

Gan, X., Y. Zhou and Z. Zhou. 2019. More education, less financial illiteracy: Evidence from China. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3490372

García, J. M. and J. Vila. 2020. Financial literacy is not enough: The role of nudging toward adequate long-term saving behavior. In: Journal of Business Research 112. 472-477.

Garg, N. and S. Singh. 2018. Financial literacy among youth. In: International Journal of Social Economics 45(1). 173–186.

Goyal, K. and S. Kumar. 2021. Financial literacy: A systematic review and bibliometric analysis. In: International Journal of Consumer Studies 45(1). 80–105.

Graham, J. R., C. R. Harvey and H. Huang. 2009. Investor competence, trading frequency, and home bias. In: Management Science 55(7). 1094–1106.

Greimel-Fuhrmann, B., M. Silgoner, R. Weber and M. Taborsky. 2016. Financial Literacy in Austria. In: Aprea, C., E. Wuttke, K. Breuer, N. K. Koh, P. Davies, B. Greimel-Fuhrmann and J. S. Lopus (eds.). International Handbook of Financial Literacy. Springer. 251–262.

Guan, S. S. 2023. The Rise of the Finfluencer. In: Journal of Law & Business 19(3). 498.

Guiso, L. and T. Jappelli. 2009. Financial Literacy and Portfolio Diversification. CSEF Working Paper 212. Centre for Studies in Economics and Finance.

Haase, F., O. Rath, M. Kurka and D. Schoder. 2023. Finfluencers: Opinion Makers or Opinion Followers? ECIS 2023 Research Papers 432. https://aisel.aisnet.org/ecis2023_rp/432

Hacker, J. S. 2018. Haase, F., O. Rath, M. Kurka and D. Schoder. 2023Economic Security. In: Stiglitz, J. E., J.-P. Fitoussi and M. Durand (eds.). For Good Measure: Advancing Research on Well-being Metrics Beyond GDP. Paris: OECD Publishing..

Hanke, S. H. and N. Krus. 2013. World hyperinflations. In: Parker, R. and R. Whaples (eds.). The Handbook of Major Events in Economic History. Routledge Publishing. 367–377.

Hartig, J. 2008. Psychometric models for the assessment of competencies. In: J. Hartig, E. K. and D. Leutner (eds.). Assessment of competencies in educational contexts. Hogrefe & Huber Publishers. 69–90.

Hastings, J., O. S. Mitchell and E. Chyn. 2011. Fees, framing, and financial literacy in the choice of pension manager. In: Mitchell, O. S. and A. Lusardi (eds.). Financial literacy: Implications for retirement security and the financial marketplace. Oxford Academic. 101–115.

Haupt, M. 2022. Measuring financial literacy: The role of knowledge, skills, and attitudes. In: Nicolini, G. and B. J. Cude (eds.). The Routledge Handbook of Financial Literacy. Routledge. 79–95.

Heath, J. A. 2016. Youth Financial Literacy in the United States: A Patchwork Approach. In: Aprea, C., E. Wuttke, K. Breuer, N. K. Koh, P. Davies, B. Greimel-Fuhrmann and J. S. Lopus (eds.). International Handbook of Financial Literacy. Springer. 369–382.

Henager, R. and M. Kabaci. 2022. Financial Education in Schools. In: Nicolini, G. and B. J. Cude (eds.). The Routledge Handbook of Financial Literacy. Routledge. 187–203.

Hilgert, M. A., J. M. Hogarth and S. G. Beverly. 2003. Household financial management: The connection between knowledge and behavior. In: Federal Reserve Bulletin 89. 309.

Hira, T. K. 2009. Personal finance: Past, present and future. Networks Financial Institute Policy Brief. Networks Financial Institute. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1522299

Holzmann, R. 2010. Bringing Financial Literacy and Education to Low and Middle Income Countries: The Need to Review, Adjust, and Extend Current Wisdom. SP Discussion Paper No. 1007. The World Bank. https://openknowledge.worldbank.org/entities/publication/2b792799-5588-51d6-843f-8fb534538c09

Holzmann, R., F. Mulaj and V. Perotti. 2013. Financial capability in low-and middle-income countries: measurement and evaluation. The World Bank. https://openknowledge.worldbank.org/bitstreams/1775e126-a99c-5ebc-95a9-58fa4e0026e1/download

Hung, A., A. M. Parker and J. Yoong. 2009. Defining and measuring financial literacy. RAND Labor and Population Working Paper Series WR-708. RAND Corporation. https://www.rand.org/content/dam/rand/pubs/working_papers/2009/RAND_WR708.pdf

Huston, S. J. 2010. Measuring financial literacy. In: Journal of Consumer Affairs 44(2). 296–316.

Hwang, H. and H. I. Park. 2023. The relationships of financial literacy with both financial behavior and financial well-being: Meta-analyses based on the selective literature review. In: Journal of Consumer Affairs 57(1). 222–244.

Ingale, K. K. and R. A. Paluri. 2022. Financial literacy and financial behaviour: A bibliometric analysis. In: Review of Behavioral Finance 14(1). 130–154.

International Labour Organization (ILO). 2024a. Financial Education. https://www.ilo.org/resource/training-material/ilo-financial-education-brochure

International Labour Organization (ILO). 2024b. Financial Education. https://www.ilo.org/resource/training-material/financial-education

Jappelli, T. 2010. Economic literacy: An international comparison. In: The Economic Journal 120(548). F429–F451.

Jappelli, T. and M. Padula. 2015. Investment in financial literacy, social security, and portfolio choice. In: Journal of Pension Economics & Finance 14(4). 369–411.

Johnson, E. and M. S. Sherraden. 2007. From financial literacy to financial capability among youth. In: J. Soc. & Soc. Welfare 34. 119.

Jump$tart Coalition for Personal Financial Literacy. 2024. About the Jump$start Coalition. https://www.jumpstart.org/about

Kadoya, Y. and M. S. R. Khan. 2020. What determines financial literacy in Japan? In: Journal of Pension Economics & Finance 19(3). 353–371.

Kaiser, T. and A. Lusardi. 2024. Financial Literacy and Financial Education: An Overview. CESifo Working Papers 11070. CESifo GmbH. https://www.cesifo.org/DocDL/cesifo1_wp11070.pdf

Kaiser, T., A. Lusardi, L. Menkhoff and C. Urban. 2022. Financial education affects financial knowledge and downstream behaviors. In: Journal of Financial Economics 145(2). 255–272.

Kaiser, T. and L. Menkhoff. 2017. Does financial education impact financial literacy and financial behavior, and if so, when? In: The World Bank Economic Review 31(3). 611–630.

Kaiser, T., L. Oberrauch and G. Seeber. 2020. Measuring economic competence of secondary school students in Germany. In: The Journal of Economic Education 51(3–4). 227–242.

Kempson, E., A. Finney and C. Poppe. 2017. Financial well-being: a conceptual model and preliminary analysis. SIFO Consumption Research Norway, Oslo and Akershus University College of Applied Sciences.

Kempson, E., V. Perotti and K. Scott. 2013. Measuring financial capability: Questionnaires and implementation guidance for low-and middle-income countries. Working Paper 79807. World Bank Group. https://documents.worldbank.org/en/publication/documents-reports/documentdetail/451321468336534492

Kimberlin, C. L. and A. G. Winterstein. 2008. Validity and reliability of measurement instruments used in research. In: American Journal of Health-System Pharmacy 65(23). 2276–2284.

Klapper, L. and A. Lusardi. 2020. Financial literacy and financial resilience: Evidence from around the world. In: Financial Management 49(3). 589–614.

Klapper, L., A. Lusardi and P. Van Oudheusden. 2015. Financial Literacy Around the World: Insights from the Standard & Poor's Ratings Services Global Financial Literacy Survey. World Bank. https://gflec.org/wp-content/uploads/2015/11/Finlit_paper_16_F2_singles.pdf

Klieme, E., J. Hartig and D. Rauch. 2008. The concept of competence in educational contexts. In: J. Hartig, E. K. and D. Leutner (eds.). Assessment of competencies in educational contexts. Hogrefe & Huber Publishers. 3–22.

Knoll, M. A. and C. R. Houts. 2012. The financial knowledge scale: An application of item response theory to the assessment of financial literacy. In: Journal of Consumer Affairs 46(3). 381–410.

Koskelainen, T., P. Kalmi, E. Scornavacca and T. Vartiainen. 2023. Financial literacy in the digital age – A research agenda. In: Journal of Consumer Affairs 57(1). 507–528.

Kovács, L. and E. Terták. 2019. Financial literacy theory and evidence. Bratislava: Verlag Dashöfer.

Kuchciak, I. and J. Wiktorowicz. 2021. Empowering financial education by banks – social media as a modern channel. In: Journal of Risk and Financial Management 14(3). 118.

Lacatus, M. L. 2016. Financial Education in Romania. In: Aprea, C., E. Wuttke, K. Breuer, N. K. Koh, P. Davies, B. Greimel-Fuhrmann and J. S. Lopus (eds.). International Handbook of Financial Literacy. Springer. 321–328.

Le Deist, F. D. and J. Winterton. 2005. What is competence? In: Human Resource Development International 8(1). 27–46.

Letkiewicz, J. 2022. Financial Literacy and Financial Education in the United States. In: Nicolini, G. and B. J. Cude (eds.). The Routledge Handbook of Financial Literacy. Routledge. 310–323.

Lučić, A., D. Barbić and M. Uzelac. 2023. Theoretical underpinnings of consumers' financial capability research. In: International Journal of Consumer Studies 47(1). 373–399.

Luo, D., L. A. Thompson and D. K. Detterman. 2003. The causal factor underlying the correlation between psychometric g and scholastic performance. In: Intelligence 31(1). 67–83.

Lusardi, A. 2003. The Impact of Financial Education on Savings and Asset Allocation. Working Paper WP 2003-061. University of Michigan Retirement Research Center.

Lusardi, A. 2011. Americans' financial capability. NBER Working Paper Series 17103. National Bureau of Economic Research. https://www.nber.org/system/files/working_papers/w17103/w17103.pdf

Lusardi, A., A. Hasler and P. J. Yakoboski. 2021. Building up financial literacy and financial resilience. In: Mind & Society 20. 181–187.

Lusardi, A., P.-C. Michaud and O. S. Mitchell. 2017. Optimal financial knowledge and wealth inequality. In: Journal of Political Economy 125(2). 431–477.

Lusardi, A. and O. S. Mitchell. 2007. Baby boomer retirement security: The roles of planning, financial literacy, and housing wealth. In: Journal of Monetary Economics 54(1). 205–224.

Lusardi, A. and O. S. Mitchell. 2011. Financial literacy around the world: an overview. In: Journal of Pension Economics & Finance 10(4). 497–508.

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

Lusardi, A., O. S. Mitchell and V. Curto. 2010. Financial literacy among the young. In: Journal of Consumer Affairs 44(2). 358–380.

Lusardi, A., O. S. Mitchell and N. Oggero. 2020. Debt and financial vulnerability on the verge of retirement. In: Journal of Money, Credit and Banking 52(5). 1005–1034.

Lusardi, A. and O. S. Mitchell. 2006. Financial Literacy and Planning: Implications for Retirement Wellbeing. Pension Research Council Working Paper 2006-1. Pension Research Council.

Lusardi, A., D. J. Schneider and P. Tufano. 2011. Financially fragile households: Evidence and implications. NBER Working Paper Series 17072. National Bureau of Economic Research. https://www2.nber.org/system/files/working_papers/w17072/w17072.pdf

Lusardi, A. and P. Tufano. 2009. Teach workers about the perils of debt. In: Harvard Business Review 87(11). 22–24.

Lusardi, A. and P. Tufano. 2015. Debt literacy, financial experiences, and overindebtedness. In: Journal of Pension Economics & Finance 14(4). 332–368.

Lyons, A., J. Grable and T. Zeng. 2019. Impacts of financial literacy on the loan decisions of financially excluded households in the People's Republic of China. ADBI Working Paper Series No. 923. Asian Development Bank Institute. https://www.adb.org/sites/default/files/publication/486521/adbi-wp923.pdf

Lyons, A. and J. Kass-Hanna. 2021. A methodological overview to defining and measuring "digital" financial literacy. In: Financial Planning Review 4(2). e1113.

Lyons, A. and J. Kass-Hanna. 2022. A multidimensional approach to defining and measuring financial literacy in the digital age. In: Nicolini, G. and B. J. Cude (eds.). The Routledge Handbook of Financial Literacy. Routledge. 61–76.

Mainwaring, H. 2020. Financial resilience of households; the extent to which financial assets can cover an income shock. Office for National Statistics. https://backup.ons.gov.uk/wp-content/uploads/sites/3/2020/04/Financial-resilience-of-households-the-extent-to-which-financial-assets-can-cover-an-income-shock.pdf

Mair, P. 2018. Modern Psychometrics with R. Springer.

McClelland, D. C. 1973. Testing for Competence Rather Than for "Intelligence". In: American Psychologist 28(1). 1–14.

McCowage, M. and J. Dwyer 2022. Economic Literacy: What Is It and Why Is It Important? Bulletin – December 2022. Reserve Bank of Australia.

Money & Pensions Service. 2020. The UK Strategy for Financial Wellbeing 2020-2030. Money & Pensions Service. https://maps.org.uk/en/our-work/uk-strategy-for-financial-wellbeing

Money Advice Service. 2015. Financial Capability Strategy for the UK. https://masassets.blob.core.windows.net/fincap-cms/files/000/000/144/original/UK_Financial_Capability_Strategy.pdf

Monticone, C. 2010. How much does wealth matter in the acquisition of financial literacy? In: Journal of Consumer Affairs 44(2). 403–422.

Morgan, P. J., B. Huang and L. Q. Trinh. 2019. The Need to Promote Digital Financial Literacy for the Digital Age. Policy Brief Under T20 Japan Task Force 7: The Future of Work and Education for the Digital Age. https://t20japan.org/policy-brief-need-promote-digital-financial-literacy

Moure, N. G. 2016. Financial literacy and retirement planning in Chile. In: Journal of Pension Economics & Finance 15(2). 203–223.

Netemeyer, R. G., D. Warmath, D. Fernandes and J. G. Lynch Jr. 2018. How am I doing? Perceived financial well-being, its potential antecedents, and its relation to overall well-being. In: Journal of Consumer Research 45(1). 68–89.

New Zealand Commission for Financial Capability. 2021. The National Strategy for Financial Capability. https://assets.retirement.govt.nz/public/Uploads/National-Strategy/National-Strategy-2021-booklet.pdf

Nicolini, G. and B. J. Cude (eds.). 2022. The Routledge Handbook of Financial Literacy. Routledge.

Nicolini, G. and M. Haupt. 2019. The assessment of financial literacy: New evidence from Europe. In: International Journal of Financial Studies 7(3). 54.

Noctor, M., S. Stoney and R. Stradling. 1992. Financial literacy: A discussion of concepts and competences of financial literacy and opportunities for its introduction into young people's learning. Report prepared for the National Westminster Bank. National Foundation for Education Research.

O'Connor, G. E., C. E. Newmeyer, N. Y. C. Wong, J. B. Bayuk, L. A. Cook, Y. Komarova, C. Loibl, L. L. Ong and D. Warmath. 2019. Conceptualizing the multiple dimensions of consumer financial vulnerability. In: Journal of Business Research 100. 421–430.

OECD. 2005. Recommendation on Principles and Good Practices for Financial Education and Awareness. OECD Legal Instrument 0338. https://legalinstruments.oecd.org/en/instruments/OECD-LEGAL-0338

OECD. 2012a. Literacy, Numeracy and Problem Solving in Technology-Rich Environments: Framework for the OECD Survey of Adult Skills. OECD. https://www.oecd.org/en/publications/literacy-numeracy-and-problem-solving-in-technology-rich-environments_9789264128859-en.html

OECD. 2012b. OECD/INFE Guidelines on Financial Education in Schools. OECD. https://web-archive.oecd.org/2015-06-09/364646-2012%20Schools%20Guidelines.pdf

OECD. 2012c. OECD/INFE High-level Principles on National Strategies For Financial Education. OECD. https://www.oecd-ilibrary.org/finance-and-investment/oecd-infe-high-level-principles-on-national-strategies-for-financial-education_12e3989f-en

OECD. 2012d. PISA 2012 Assessment and Analytical Framework: Mathematics, Reading, Science, Problem Solving and Financial Literacy. PISA, OECD. https://doi.org/10.1787/9789264190511-en

OECD. 2014. PISA 2012 Results: Students and Money, Financial Literacy Skills for the 21st Century (Volume VI). PISA, OECD. http://dx.doi.org/10.1787/9789264208094-en

OECD. 2015a. National Strategies for Financial Education. OECD/INFE Policy Handbook. OECD. https://www.oecd.org/content/dam/oecd/en/publications/reports/2015/11/national-strategies-for-financial-education-oecd-infe-policy-handbook_8a22c019/a8916d0e-en.pdf

OECD. 2015b. OECD/INFE Core Competencies Framework on financial literacy for Youth. OECD.

OECD. 2016a. G20/OECD INFE Core Competencies Framework on financial literacy for Adults. OECD.

OECD. 2016b. OECD/INFE International Survey of Adult Financial Literacy Competencies. OECD. https://www.oecd-ilibrary.org/finance-and-investment/oecd-infe-international-survey-of-adult-financial-literacy-competencies_28b3a9c1-en

OECD. 2018. G20/OECD INFE Policy Guidance on Digitalisation and Financial Literacy. OECD. https://www.oecd.org/en/publications/g20-oecd-infe-policy-guidance-on-digital-financial-literacy_effe2693-en.html

OECD. 2020a. Advancing the Digital Financial Inclusion of Youth. OECD. https://www.oecd-ilibrary.org/finance-and-investment/advancing-the-digital-financial-inclusion-of-youth_21b829d8-en

OECD. 2020b. PISA 2018 Results (Voume IV): Are Students Smart About Money. PISA, OECD. https://www.oecd-ilibrary.org/education/pisa-2018-results-volume-iv_48ebd1ba-en

OECD. 2020c. Recommendation of the Council on Financial Literacy. OECD Legal Instrument 0461. https://legalinstruments.oecd.org/en/instruments/OECD-LEGAL-0461

OECD. 2021a. A National Financial Literacy Strategy for Austria. OECD. https://www.oecd-ilibrary.org/finance-and-investment/a-national-financial-literacy-strategy-for-austria_f6d11a4b-en

OECD. 2021b. G20/OECD-INFE Report on supporting financial resilience and transformation through digital financial literacy. OECD.

OECD. 2022a. Evaluation of National Strategies for Financial Literacy. OECD. https://web-archive.oecd.org/2022-03-06/624946-Evaluations-of-National-Strategies-for-Financial-Education.pdf

OECD. 2022b. Global Money Week Annual Report 2022. OECD. https://globalmoneyweek.org/resources/gmw2022/GMW%20Annual%20Report%202022_3.pdf

OECD. 2022c. OECD/INFE Toolkit for Measuring Financial Literacy and Financial Inclusion 2022. OECD. https://doi.org/10.1787/cbc4114f-en

OECD. 2023a. Financial Consumers and Sustainable Finance: Policy Implications and Approaches. OECD Business and Finance Policy Papers. OECD. https://doi.org/10.1787/318d0494-en

OECD. 2023b. OECD International Network on Financial Education: An Overview. OECD. https://www.oecd.org/financial/education/oecd-infe-overview.pdf

OECD. 2023c. OECD/INFE 2023 International Survey of Adult Financial Literacy. OECD. https://www.oecd.org/en/publications/oecd-infe-2023-international-survey-of-adult-financial-literacy_56003a32-en.html

OECD. 2023d. PISA 2022 Assessment and Analytical Framework. PISA, OECD. https://www.oecd.org/en/publications/pisa-2022-assessment-and-analytical-framework_dfe0bf9c-en.html

OECD. 2024a. National financial literacy strategy for Greece. OECD. https://reform-support.ec.europa.eu/document/download/fb8fe40e-a80c-4199-a005-5e8fe941f64c_en?filename=Nationalfinancial-literacy-strategy-Greece.pdf

OECD. 2024b. PISA 2022 Results (Volume IV): How Financially Smart Are Students? PISA, OECD. https://www.oecd.org/en/publications/pisa-2022-results-volume-iv_5a849c2a-en/full-report.html

OECD. n.d. PISA test. https://www.oecd.org/en/about/programmes/pisa/pisa-test.html

Oehler, A. and C. Werner. 2008. Saving for retirement—a case for financial education in Germany and UK? An economic perspective. In: Journal of Consumer Policy 31. 253–283.

Ouachani, S., O. Belhassine and A. Kammoun. 2021. Measuring financial literacy: A literature review. In: Managerial Finance 47(2). 266–281.

Paraboni, A. L., F. M. Soares, A. C. G. Potrich and K. M. Vieira. 2020. Does formal and business education expand the levels of financial education? In: International Journal of Social Economics 47(6). 769–785.

Perotti, V., S. Zottel, G. Iarossi and A. Bolaji-Adio. 2013. Making Sense of Financial Capability Surveys Around the World: A Review of Existing Financial Capability and Literacy Measurement Instruments. World Bank Group. http://documents.worldbank.org/curated/en/220801468323962930/Making-sense-of-financial-capability-surveys-around-the-World-a-review-of-existing-finan cial-capability-and-literacy-measurement-instruments

Personal Finance Research Centre. 2005. Measuring financial capability: an exploratory study. Financial Services Authority. https://www.bristol.ac.uk/media-library/sites/geography/migrated/documents/pfrc0510.pdf

Pfluger, B. 2023. Wer sparen oder vorsorgen möchte, sollte auch wissen, wofür. Der Standard. https://www.derstandard.at/story/3000000175574/wer-sparen-oder-vorsorgen-moechte-sollte-auch-wissen-wofuer

Pokropek, A., G. N. Marks and F. Borgonovi. 2022a. How much do students' scores in PISA reflect general intelligence and how much do they reflect specific abilities? In: Journal of Educational Psychology 114(5). 1121.

Pokropek, A., G. N. Marks, F. Borgonovi, P. Koc and S. Greiff. 2022b. General or specific abilities? Evidence from 33 countries participating in the PISA assessments. In: Intelligence 92. 101653.

Potrich, A. C. G., K. M. Vieira and G. Kirch. 2015. Determinants of financial literacy: Analysis of the influence of socioeconomic and demographic variables. In: Revista Contabilidade & Finanças 26. 362–377.

Potrich, A. C. G., K. M. Vieira and G. Kirch. 2018. How well do women do when it comes to financial literacy? Proposition of an indicator and analysis of gender differences. In: Journal of Behavioral and Experimental Finance 17. 28–41.

Preston, A. C. and R. E. Wright. 2019. Understanding the gender gap in financial literacy: Evidence from Australia. In: Economic Record 95. 1–29.

Prete, A. L. 2013. Economic literacy, inequality, and financial development. In: Economics Letters 118(1). 74–76.

Ranyard, R., S. McNair, G. Nicolini and D. Duxbury. 2020. An item response theory approach to constructing and evaluating brief and in-depth financial literacy scales. In: Journal of Consumer Affairs 54(3). 1121–1156.

Ratcliff, C., B. Middlewood, M. A. Knoll, G. Guillory and M. Davies. 2022. Emergency Savings and Financial Security: Insights from the Making Ends Meet Survey and Consumer Credit Panel. In: Consumer Financial Protection Bureau Office of Research Reports Series (22-1).

Remund, D. L. 2010. Financial literacy explicated: The case for a clearer definition in an increasingly complex economy. In: Journal of Consumer Affairs 44(2). 276–295.

Retzmann, T. and G. Seeber. 2016. Financial education in general education schools: A competence model. In: Aprea, C., E. Wuttke, K. Breuer, N. K. Koh, P. Davies, B. Greimel-Fuhrmann and J. S. Lopus (eds.). International Handbook of Financial Literacy. Springer. 9–23.

Rieger, M. O. 2020. How to measure financial literacy? In: Journal of Risk and Financial Management 13(12). 324.

Riitsalu, L. and W. F. Van Raaij. 2022. Current and future financial well-being in 16 countries. In: Journal of International Marketing 30(3). 35–56.

Rindermann, H. 2007. The g-factor of international cognitive ability comparisons: The homogeneity of results in PISA, TIMSS, PIRLS and IQ-tests across nations. In: European Journal of Personality 21(5). 667–706.

Rink, U., Y. M. Walle and S. Klasen. 2021. The financial literacy gender gap and the role of culture. In: The Quarterly Review of Economics and Finance 80. 117–134.

Salignac, F., A. Marjolin, R. Reeve and K. Muir. 2019. Conceptualizing and measuring financial resilience: A multidimensional framework. In: Social Indicators Research 145. 17–38.

Santander. 2023. Financial Education. https://www.santander.com/en/our-approach/inclusive-and-sustainable-growth/financial-education

Schuhen, M. and S. Schürkmann. 2014. Construct validity of financial literacy. In: International Review of Economics Education 16. 1–11.

Serido, J., S. Shim and C. Tang. 2013. Adevelopmental model of financial capability: Aframework for promoting a successful transition to adulthood. In: International Journal of Behavioral Development 37(4). 287–297.

Shiller, R. J. 2008. The subprime solution: How today's global financial crisis happened, and what to do about it. Princeton University Press.

Son, J. and J. Park. 2019. Effects of financial education on sound personal finance in Korea: Conceptualization of mediation effects of financial literacy across income classes. In: International Journal of Consumer Studies 43(1). 77–86.

Sorgente, A. and M. Lanz. 2019. The multidimensional subjective financial well-being scale for emerging adults: Development and validation studies. In: International Journal of Behavioral Development 43(5). 466–478.

Soroko, A. 2022. Teaching young people more than "how to survive austerity:" From traditional financial literacy to critical economic literacy education. In: Theory & Research in Social Education. 1–29.

Stillwell, S. 2016. Financial Education in the UK: A Case Study of Practice. In: Aprea, C., E. Wuttke, K. Breuer, N. K. Koh, P. Davies, B. Greimel-Fuhrmann and J. S. Lopus (eds.). International Handbook of Financial Literacy. Springer. 357–368.

Tenney, J. A. and C. M. Kalenkoski. 2019. Financial ratios and financial satisfaction: Exploring associations between objective and subjective measures of financial well-being among older Americans. In: Journal of Financial Counseling and Planning 30(2). 231–243.

Unknown. 1848. The Young Clerk's Manual; or, Counting-House Assistant. London: Cradock & Company. https://books.google.at/books?id=3TpkAAAAcAAJ

U.S. Financial Literacy and Education Commission. 2020. U.S. Strategy for Financial Literacy. https://home.treasury.gov/system/files/136/US-National-Strategy-Financial-Literacy-2020.pdf

Van der Schors, A. and O. Simonse. 2016. Financial Literacy in the Netherlands. In: Aprea, C., E. Wuttke, K. Breuer, N. K. Koh, P. Davies, B. Greimel-Fuhrmann and J. S. Lopus (eds.). International Handbook of Financial Literacy. Springer. 305–320.

Van Rooij, M., A. Lusardi and R. Alessie. 2011. Financial literacy and stock market participation. In: Journal of Financial economics 101(2). 449–472.

Van Rooij, M., A. Lusardi and R. J. M. Alessie. 2012. Financial literacy, retirement planning and household wealth. In: The Economic Journal 122(560). 449–478.

Voith, V. and M. Zieser. 2024. International Survey of Adult Financial Literacy 2023: first results for Austria. OeNB Reports 2024/13. OeNB. https://www.oenb.at/dam/jcr:ce083d11-f899-4dc5-bdb5-43a32a537b84/report-2024-13-financial-literacy.pdf

Walstad, W. B., K. Rebeck and R. B. Butters. 2013. The test of economic literacy: Development and results. In: The Journal of Economic Education 44(3). 298–309.

Warmath, D. 2022. Financial literacy and financial well-being. In: Nicolini, G. and B. J. Cude (eds.). The Routledge Handbook of Financial Literacy. Routledge. 505–516.

Warmath, D. and D. Zimmerman. 2019. Financial Literacy as More than Knowledge: The Development of a Formative Scale through the Lens of Bloom's Domains of Knowledge. In: Journal of Consumer Affairs 53(4). 1602–1629.

Westera, W. 2001. Competences in education: A confusion of tongues. In: Journal of Curriculum Studies 33(1). 75–88.

Willis, L. E. 2008. Against Financial-Literacy Education. In: Iowa Law Review 94. 197–285.

Willis, L. E. 2022. Alternatives to Financial Education. In: Nicolini, G. and B. J. Cude (eds.). The Routledge Handbook of Financial Literacy. Routledge. 274–292.

Wirtschaftskammer Wien (Regional Economic Chamber, Vienna). 2023. finance fit. https://financefit.at

Wolf, M. 2018. Ain't misbehaving: Behavioral economics and the making of financial literacy. economic sociology_the european electronic newsletter 19(2). Max Planck Institute for the Study of Societies. 10–18.

World Bank. 2014. Financial Education Programs and Strategies. Approaches and Available Resources. The World Bank. https://documents1.worldbank.org/curated/en/901211472719528753/pdf/108104-BRI-FinancialEducationProgramsandStrategies-PUBLIC.pdf

Xenophon. ca. 360 BCE [2008]. The Economist. Project Gutenberg. https://www.gutenberg.org/files/1173/1173-h/1173-h.htm

Xiao, J. J., J. Huang, K. Goyal and S. Kumar. 2022. Financial capability: a systematic conceptual review, extension and synthesis. In: International Journal of Bank Marketing 40(7). 1680–1717.

Xiao, J. J. and B. O'Neill. 2016. Consumer financial education and financial capability. In: International Journal of Consumer Studies 40(6). 712–721.

Yakoboski, P. J., A. Lusardi and A. Hasler. 2018. Millennial financial literacy and Fin-tech use: Who knows what in the digital era. TIAA Institute and GFLEC. https://gflec.org/wp-content/uploads/2018/09/TIAA-Institute-GFLEC_Millennial-P-Fin-Index_September-2018.pdf

Yoong, J., L. Mihaly, B. Sebastian, R. Lila and H. Angela. 2013. A Toolkit for the Evaluation of Financial Capability Programs in Low- and Middle-Income Countries. Working Paper 79808. World Bank Group. http://documents.worldbank.org/curated/en/677231468107071094/A-toolkit-for-the-evaluation-of-financial-capability-programs-in-low-and-middle-income-countries

Zaimovic, A., A. Torlakovic, A. Arnaut-Berilo, T. Zaimovic, L. Dedovic and M. Nuhic Meskovic. 2023. Mapping Financial Literacy: A Systematic Literature Review of Determinants and Recent Trends. In: Sustainability 15(12). 9358.