

Chapter 1

Financial literacy

Uncovering avenues for future research

Kenneth De Beckker

1.1 Introduction

Lately, financial literacy has gained in importance due to the global financial crisis of 2008. Many studies acknowledge the effect of financial literacy on personal finance and economic outcomes (Lusardi & Mitchell, 2014). Specifically, for the crisis of 2008 researchers find that consumers' ability to face the crisis differs depending on their level of financial literacy (e.g. Klapper, Lusardi, & Panos, 2013).

Today's society is characterized by various important evolutions which increase the need for financial literacy. First, consumers are forced to take greater responsibility for their personal well-being. The demographic evolution of increasing life expectancy and decreasing birth rates leads to a larger group of retirees compared to the working population. Consequently, governments around the world need to make cuts in retirement benefits. In order to maintain personal well-being at retirement age, consumers have to increase their personal savings. Second, in the aftermath of the financial crisis, central banks around the world have brought interest rates to an all-time low. In order to achieve returns that compensate for inflation, consumers are forced to reallocate their portfolio from relatively safe investments to more complex financial products. This requires extensive knowledge of financial markets and the ability to evaluate alternative investment opportunities. Third, opportunities to spend money increased with the surge in e-commerce which allows around the clock shopping. This facilitates excessive consumption, especially for those vulnerable to impulsive buying.

Recognizing the importance of financial literacy in today's society, this chapter presents an overview of the current literature and suggests avenues for future research. Figure 1 provides a snapshot of the financial literacy literature. Central is the discussion on how to define financial literacy. In most studies, definitions are limited to the knowledge of some financial concepts. By focussing only on financial knowledge, one ignores the fact that consumers will value the effect of financial literacy on their personal well-being. Given that well-being is the result of financial behaviours, which in turn are shaped by financial attitudes, a broader definition is required. An important stream of the literature concerns itself with the determinants of financial literacy. Most of these studies exclusively look at determinants on the level of individuals such as various socio-economic characteristics. However, an individual's level of financial literacy is also shaped by collective forces such as national culture. Often cultural values are transmitted through financial socialization. Another stream of the literature focusses on the effects of financial knowledge on different

financial behaviours. While the importance of financial literacy on multiple aspects of daily life is empirically proven, most research now examines effective ways to improve financial literacy.

The methodology followed in this chapter consists of two main steps. The first step included a comprehensive research in *Web of Science* using the terms ‘financial literacy’, ‘financial knowledge’, ‘financial capabilities’, ‘financial education’ and ‘financial socialization’. In the second step I examined two existing literature reviews: Lusardi & Mitchell (2014) and Stolper & Walter (2017), to search for relevant references not covered by the keyword search. Finally, I included selected policy reports from international institutions relevant to the field.

This chapter is structured as follows. Section 1.2 discusses the definition of financial literacy and its measurement. Section 1.3 compares the level of financial literacy in different countries around the world. Section 1.4 explores the determinants of financial literacy. Section 1.5 surveys literature on the consequences of financial (il)literacy. Section 1.6 offers an overview of initiatives geared towards improving financial literacy. Section 1.7 concludes and recommends areas for future research.

1.2 Defining and measuring financial literacy

Today, there exists a broad common understanding of the importance of financial literacy in financial decision-making (Lusardi & Mitchell, 2014). Many researchers have conducted studies examining the level of financial literacy among different groups in society: adults (Klapper, Lusardi, & van Oudheusden, 2015; OECD, 2016), youth (Lusardi, Mitchell, & Curto, 2010; OECD, 2017) and the elderly (Lusardi, Mitchell, & Curto, 2014). Evidence points to multiple shortcomings in many countries (Lusardi & Mitchell, 2011a). In order to enhance comparability and consistency across the evidence base, one needs a common understanding of the concept as well as a shared operational measure of financial literacy (Hung, Parker, & Yoong, 2009; Remund, 2010). However, as shown by Huston (2010) there is no such thing as a standardized instrument to define and measure financial literacy. In Huston’s survey of 71 studies using 52 different data sets, he finds that 72% of them did not even include an explicit definition of financial literacy. Among those studies which did, there were large discrepancies between the definitions used. The terms financial literacy, financial knowledge, and financial education are often used as synonyms. Like general literacy, “*financial literacy should be conceptualized as having two dimensions – understanding (personal financial knowledge) and use (personal finance application)*” (Huston, 2010; p. 306). In a similar fashion, Remund (2010), who analyses how financial literacy has been interpreted and measured by researchers since 2000, defines financial literacy as “*a measure of the degree to which one understands key financial concepts and possess the ability and confidence to manage personal finances through appropriate, short-term decision-making and sound, long-range financial planning, while mindful of life events and changing economic conditions*” (Remund, 2010; p. 284).

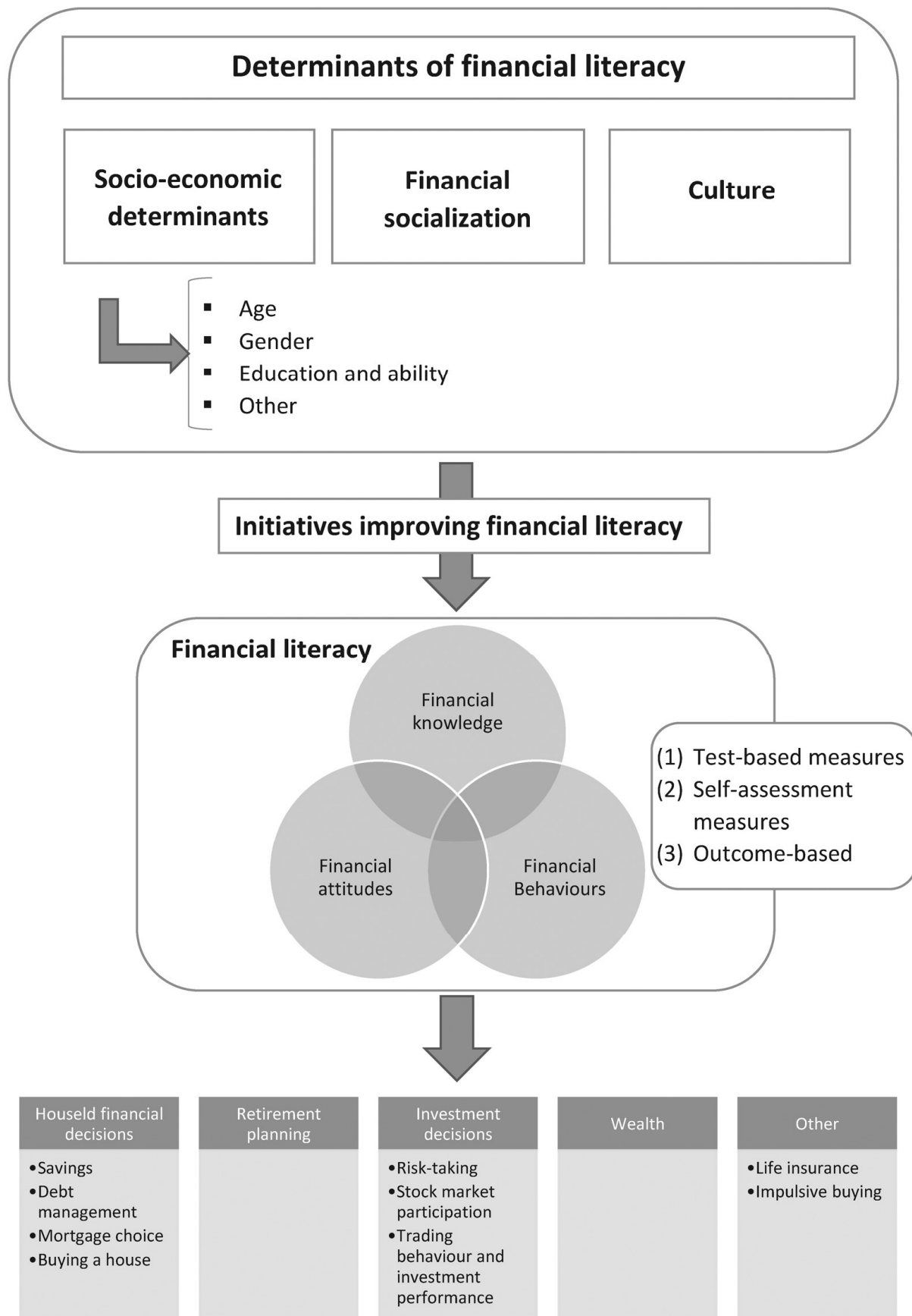


Figure 1. Financial literacy an overview

In recent years the Organization for Economic Cooperation and Development (OECD) has played a leading role in stimulating the international debate on financial literacy. To do so, the OECD carries out several studies to compare the level of financial literacy across countries for 15-year-olds (OECD, 2014, 2017) as well as for adults (OECD, 2016). Their definition of financial literacy comprises both a knowledge and an application component: “*Financial literacy is knowledge and understanding of financial concepts and risks, and the skills, motivation and confidence 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.*” (OECD, 2014; p.33).

The conceptual definitions discussed above have to be translated into measurable criteria. Three main measures of financial literacy are used in the literature: (1) test-based, (2) self-assessment and (3) outcome-based.

1.2.1 Test-based measures

Most researchers apply test-based measures to capture financial literacy (Remund, 2010). Test questions commonly refer to general numeracy skills (e.g. compounding interest calculation), financial concepts (e.g. inflation, risk diversification or time value of money) and knowledge of financial products (e.g. stocks, bonds, mutual funds or mortgages) (Stolper & Walter, 2017). In most cases, the level of financial literacy is operationalized as the number or fraction of correct answers on a performance test (e.g. Lusardi & Mitchell, 2008). Some adopt a more sophisticated approach by weighting questions according to difficulty (e.g. Behrman, Mitchell, Soo, Bravo, 2012; Lusardi et al., 2014) or by applying factor analysis (e.g. Potrich, Vieira, & Kirch, 2018).

One of the most widely tested sets of questions is added to the 2004 Health and Retirement Study by Lusardi & Mitchell (2008) and has become known as the *Big Three* (Lusardi & Mitchell, 2014). The exact wording of the questions is as follows:

1. *Ability to do a simple compounded interest calculation (Numeracy)*. Suppose you had \$ 100 in savings account and the interest rate was 2 percent per year. After 5 years, how much do you think you would have in the account if you left the money grow: [**more than \$ 102**; exactly \$ 102; less than \$ 102; do not know; refuse to answer.]
2. *Understanding of inflation*. Imagine that the interest rate on your savings account was 1 percent per year and inflation was 2 percent per year. After 1 year, would you be able to buy: [more than, exactly the same as, or **less than today** with the money in this account; do not know; refuse to answer.]
3. *Understanding of risk diversification*. Do you think that the following statement is true or false? “Buying a single company stock usually provides a safer return than a stock mutual fund” [true; **false**; do not know; refuse to answer]

Despite the relatively easiness of the *Big Three* question, only half of the respondents responded correctly to the first two questions, and only one third of the sample could answer all three questions correctly (Lusardi & Mitchell, 2014).

The Big Three questions were used extensively in many studies over the years. However, they were often extended or replaced by other questions geared towards specific topics such as debt literacy (e.g. Lusardi & Tufano, 2015; van Ooijen & van Rooij, 2016), risk literacy (e.g. Lusardi, 2015) and stock market literacy (e.g. Balloch, Nicolae, & Philip, 2015). For the 2012 and 2015 PISA assessment (OECD, 2014, 2017), the OECD has adopted a much broader approach than the *Big Three* questions to assess the financial literacy of 15-year-olds. Three dimensions are used: (1) knowledge and understanding (content), (2) approaches and mental strategies (processes) and (3) financial situations (contexts). In the 2015 OECD/INFE International Survey of Adult Financial Literacy Competences (OECD, 2016), literacy is measured through questions and statements referring to financial knowledge, financial behaviour and financial attitudes.

1.2.2 Self-assessment measures

A second measure of financial literacy often used in the literature is individuals' self-assessment of their financial capabilities, which can be seen as their confidence to make financial decisions. Given that individuals are not always aware of their actual knowledge, they must often make decisions based on how much they think they know (Hung et al., 2009). Comparison of test-based and self-assessment measures of financial literacy reveals that consumers are sometimes too optimistic about how much they actually know (e.g. Lusardi & Mitchell, 2011c; Lusardi & Tufano, 2015). However, in general test-based and self-assessment measures of financial literacy tend to be positively correlated (Hastings, Madrian, & Skimmyhorn, 2013).

1.2.3 Outcome-based measures

An alternative measure of financial literacy, limited by the availability of administrative data, is to identify individuals with actual financial decisions and use this as a proxy for financial literacy (Hastings et al., 2013). This proxy serves as an indicator to predict other outcomes. For example, Calvet, Cambell, & Sodini (2009) use administrative data from Sweden to construct an index of financial sophistication. This index is based on the household's ability to avoid three financial mistakes: portfolio under-diversification, inertia in risk-taking, and exhibiting the disposition effect in stock holding. In their analysis they relate this index, which acts as a proxy for financial literacy, to financial wealth. As expected, financial sophistication is positively associated with financial wealth.

1.3 The level of financial literacy around the world

Internationally, interest in financial literacy research is strong and ongoing. However, most studies provide single country evidence measured by country-specific instruments, which makes comparison across countries rather difficult (Nicolini, Cude, & Chatterjee, 2013). In an attempt to examine adults' financial literacy across countries, Stolper &

Walter (2017) compare the results of 22 single country studies, applying the Big Three questions as measure for financial literacy. They document the highest competence levels in upper-income countries. However, these levels are still rather low in absolute terms: the average number of adults answering all Big Three questions correctly is 35 % for the upper-income countries, compared to only 13 % for middle-income countries and 4 % for transition economies.

More cross-country evidence is provided by Klapper et al. (2015), who use data from the Standard & Poor's Global Financial Literacy Survey. In the survey, four fundamental concepts for financial decision-making – basic numeracy, interest compounding, inflation and risk diversification are answered by 150,000 nationally representative adults in more than 140 countries. The authors observe that, based on their definition of financial literacy – answering at least three of four test question correctly – only 33 percent of adults worldwide are financially literate. However, there is large heterogeneity across countries. In countries such as Australia, Canada, Denmark, Finland, Germany, Israel, The Netherlands, Norway, Sweden, and the United Kingdom the literacy rate is the highest. In these countries, 65 percent or more of adults are financially literate. This contrasts with South Asia, where only 25 percent of adults or fewer are financially literate.

Recently, the OECD (2016) provided a cross-country comparison of financial literacy levels across 30 countries taking part in the International Network of Financial Literacy (INFE). In total, 51,650 adults aged 18 to 79 were interviewed. In contrast to previous cross-country research that focused only on some knowledge concepts, this study defines financial literacy as a combination of financial knowledge, behaviour and attitudes. Overall levels of financial literacy are relatively low: the mean score is 13.2 out of 21. The study shows heterogeneity across countries in the overall score as well as the performance on the different domains. While citizens in France have the highest overall score (14.9), citizens of central European countries such as Croatia (12.0), Belarus (11.7) and Poland (11.6) score lowest. In Poland and Croatia adults score low non both financial knowledge and financial behaviour. Adults living on the British Virgin Islands show shortcomings on financial knowledge, while citizens living in Jordan score particular low on financial attitudes. This evidence points to the importance of more country-specific financial education initiatives.

Alongside studies on adults, international evidence exists on financial literacy levels among adolescents. Specifically, the OECD (2017) examines the financial literacy levels of 15-year old students in its PISA survey. On average, only 22 % of 15-year-old students across the 15 participating OECD countries score below the threshold of financial literacy, and 12 % are situated among the top performers. Looking to the country-specific results, students from Shanghai-Chine score best with only 9 % of students considered as financial illiterate, whereas Brazil students score poorest with 53 % of students categorized as financially illiterate.

1.4 Determinants of financial literacy

After discussing the levels of financial literacy in the previous section, this section now discusses the determinants of financial literacy. These can be divided into three categories: (1) socio-economic determinants, (2) the effect of financial socialization, and (3) culture. Table 1 provides an overview of available surveys examining the determinants of financial literacy.

1.4.1 Socio-economic determinants

Age

One of the factors affecting financial literacy is age. According to many studies in the US (e.g. Lusardi & Tufano, 2015; Xiao, Chen, & Sun, 2015) as well as in the rest of the world (e.g. Bucher-Koenen & Lusardi, 2011; Lusardi & Mitchell, 2011b), financial literacy follows a hump-shape distribution with respect to age. It peaks at middle age and is lowest among the young (Lusardi et al., 2010) and the old (Lusardi et al., 2014). Lusardi et al. (2010) find that fewer than one third of young people have knowledge of basic concepts such as inflation and risk diversification; and can do simple interest rate calculations. The same is true for the elderly. Lusardi et al. (2014) show that many older respondents fail to understand essential aspects of risk diversification, asset valuation, portfolio choice, and investment fees. Finke, Howe, & Huston (2017) estimate that after the age of 60, the average financial literacy score falls with about 1% each year. However, despite scoring poorly, many older people rank themselves high on financial literacy. This overconfidence makes them vulnerable to financial fraud (DeLiema, Deevy, Lusardi, & Mitchell, 2018).

Gender

The gender gap with respect to financial literacy is another factor widely discussed in the literature. Many researchers find that women have significantly lower levels of financial literacy than men (e.g. Bucher-Koenen, Lusardi, Alessie, & van Rooij, 2017; Chen & Volpe, 2002; Lusardi & Mitchell, 2008; Lusardi et al., 2010). This gap is present for all ages (Chen & Volpe, 2002; Lusardi & Mitchell, 2008; Lusardi et al., 2010). Many researchers have tried to explain the gender gap. One of the explanations revolves around traditional role models within the household (Hsu, 2016), where men traditionally make the majority of household decisions and where women only invest in financial literacy later in their lives (Fonseca, Mullen, Zamarro, & Zissimopoulos, 2012). As Bucher-Koenen et al., (2017) argue, this implies that the gender gap should change when taking into account marital status, but this is not confirmed by their sample with data from American, Dutch and German surveys.

Another potential explanation for the gender gap is differences in educational level among men and women. If men are generally more educated than women, it seems obvious that women are also less financially literate given the positive effects of education

(Herd, Holden, & Su, 2012). However, Mahdavi & Horton (2014), who examine alumni from a highly selective U.S. women's liberal arts college, still find low levels of financial literacy among this group of highly-educated women. In an attempt to decompose the financial literacy gap into parts explainable by observed characteristics and parts that cannot be explained by observables, Cupák, Fessler, Schneebaum, & Silgoner (2018) use the Blinder-Oaxaca decomposition for a sample of 12 countries. Their results show a significant gap in financial literacy between men and women in each country except Croatia and Russia. Interestingly, the gender gap is smaller or statistically insignificant in former communist countries (Croatia, Hungary and Russia). This may be related to lingering social and economic norms from the communist era, when women were more active participants in economic life and decision-making. The same explanation applies to the findings of Bucher-Koenen et al. (2017), who find only strong gender differences among respondents living in the capitalist Western part of Germany but no significant difference among respondents of the former communist Eastern part of Germany.

Finally, Drive, Lührmann, & Winter (2016) argue that gender differences in financial literacy are rooted in gender stereotypes. Stereotypes represent the beliefs people have about the levels and the future returns of financial knowledge of women and men. If beliefs are biased towards higher competencies for males, women will automatically invest less in financial literacy, starting from childhood. The findings of Driva et al. (2016) show that the gender gap in financial literacy is not present among teenagers who do not share this biased view. In contrast, the more teenagers agree with such stereotypes, the wider the gap.

Education and ability

Most studies reveal a positive impact of education on financial literacy (Lusardi, 2012; Lusardi & Mitchell, 2007; Lusardi et al., 2010). As indicated by Lusardi & Mitchell (2014), those without a college degree are less likely to understand basic financial concepts such as inflation, risk diversification and the ability to do simple interest calculations. This is of particular importance since lower early-life schooling is linked with late-life financial knowledge (Herd et al., 2012).

However, the relationship between education and financial literacy can be partly driven by cognitive abilities (Lusardi et al., 2010). Hastings et al., (2013) document that individuals with higher cognitive abilities and more affinity with numbers and numerical calculations have, on average, higher levels of financial literacy. Christelis, Japelli, & Padulo (2010) also link cognitive abilities with sound financial behaviours. Using the Survey of Health and Retirement in Europe (SHARE), Christelis et al. (2010) find that the propensity to invest in stocks is strongly correlated with cognitive abilities.

Other

In addition to the determinants discussed above, there are numerous other factors with potential impact on financial literacy. One such factor is labour market status. Bucher-

Koenen & Lusardi (2011) for instance find that only about 45% of respondents in Germany who are not in the labour force are able to correctly answer the Big Three questions. This increases to 62% for those employed and to 67% for those who are self-employed. The positive effect of employment on financial literacy may be partly related to financial education programs offered in the workplace or to learning from colleagues (Lusardi & Mitchell, 2011a). Many studies have also pointed to race and ethnicity, with African-American and Hispanic respondents having lower levels of financial literacy in the US context (Lusardi et al., 2010, 2014). The literature points also to a positive association between an individual's income and wealth levels and their level of financial literacy (Monticone, 2010).

1.4.2 Financial socialization

Some of the financial knowledge and financial attitudes of individuals are not acquired through formal learning but through interactions of the person with other agents. This type of interaction is called financial socialization (Gudmunson & Danes, 2011). Many researchers have examined the role of different socialization agents such as family, school or work (e.g. Grohmann, Kouwenberg, & Menkhoff, 2015; Shim, Barber, Card, Xiao, & Serido, 2010; Sohn, Joo, Grable, Lee, & Kim, 2012). The most important socialization agents are parents. Shim et al. (2010) find that their influence on young adults' financial learning, attitude and behaviour is substantially greater than the combined effect of work experience and high school financial education. The parents' influence depends on various factors such as their educational background (Lusardi et al., 2010) and social class (Luhr, 2018). Lusardi et al. (2010) for instance observe a positive relation between financial literacy levels of young adults and the educational attainment of their parents. Drawing on in-depth interviews with 52 parents and adolescents in the United States Luhr (2018) concludes that middle-class parents seems to be more proactive in teaching their children about finances. Working-class parents, however, often feel unequipped to teach their children about financial matters.

Parents only directly influence financial attitudes of young adults. Their influence on financial behaviour is indirect and mediated through financial attitudes. There seems to be no effect on financial knowledge (Jorgensen & Salva, 2010). Parental influence manifests itself in different forms. Many researchers (Grinstein-Weiss, Spader, Yeo, Taylor, & Books Freeze, 2011; Jorgensen, Rappleyea, Schweichler, Fang, & Moran, 2017; Tang, Baker, & Peter, 2015) provide evidence of a positive relation between financial instruction from parents in childhood and sound financial behaviours in adulthood. Financial discussions in the home are another way through which parents influence the financial literacy levels of children and young adults (Agnew & Cameron-Agnew, 2015). More frequent parent-child discussions are associated with more positive financial attitudes (Agnew, Maras, & Moon, 2018). Van Campenhout (2015) argues that parents play a key role in young people's financial socialization process and should therefore be more involved in financial education initiatives.

Alongside parents, the media also seem to play an important role in the financial socialization of young adults. Sohn et al. (2012) find that media as socialization is positively related to financial literacy of South-Korean youth. Finally, the neighbourhood people reside in also seems to matter. Lachance (2014) shows that people in a better-educated neighbourhood are more likely to have a higher financial literacy score. This remains significant even after controlling for multiple other individual characteristics.

1.4.3 Culture

Recently, some researchers have examined the impact of culture on financial literacy (Brown, Henchoz, & Spycher, 2018; Fuchs-Schündeln, Masella, & Paule-Paludkiewicz, 2019; Kim, Choi, & Lee, 2017). Related to financial socialization, culture represents a set of customary beliefs and values that ethnic, religious, and social groups transmit fairly unchanged from generation to generation (Guiso, Sapienza, & Zingales, 2006). While financial socialization affects financial literacy of individuals through the micro-level – the household – culture is situated on the macro-level and affects the financial literacy of (sub)populations.

Culture is not tangible, and researchers who investigate the link between culture and financial literacy have to be careful when identifying it. In order to separate culture from other economic and institutional factors, Fuchs-Schündeln et al. (2019) apply an epidemiological approach to identify the effect of culture on sound financial behaviours such as saving. Specifically, they link the behaviour of second-generation migrants in Germany and the United Kingdom to the attitudes and behaviour of individuals in the home country of their ancestors. Hence, differences in saving behaviour of second-generation immigrants in Germany are an indicator of cultural effects. Fuchs-Schündeln et al. (2019) show that culture indeed has a significant effect on the saving behaviour of households. Immigrants of the second generation whose grandparents come from countries with higher importance assigned towards thrift and wealth accumulation save more.

Kim et al. (2017), who compare the level of financial literacy of North-Korean refugees living in South-Korea with native-born South-Koreans, find that North-Korean refugees are significantly less financially literate than their South-Koreans counterparts. The financial literacy of refugees only marginally improves the longer they reside in South-Korea. This indicates that financial literacy developed early in life, through culture, cannot be easily modified at a later stage.

Brown et al. (2018) examine the effect of culture on financial knowledge by comparing students across the within-country language border in Switzerland. Students from the German-speaking region have a higher level of financial literacy than those from the French speaking region. This is caused by cultural differences rather than unobserved heterogeneity in schooling. The authors show that the difference across the language groups is stronger for native students and monolingual students than for immigrant students and bilingual students.

Table 1. Determinants of financial literacy

Authors	Country	Focus group	Socio economic determinants				Financial socialization	Culture
			Age	Gender	Education	Other		
Agnew & Cameron-Agnew (2015)	New Zealand	14 or 15 years old					×	
Agnew et al. (2018)	England and New Zealand	11- and 12-year olds					×	
Bucher-Koenen & Lusardi (2011)	Germany	Adults between 25 and 65 year old	×					×
Bucher-Koenen et al. (2017)	USA, The Netherlands, Germany	Adults		×				
Brown et al. (2018)	Switzerland	15-year-old students						×
Chen & Volpe (2002)	USA	University and college students		×				
Christelis et al. (2010)	11 countries	Households			×			
Cupák et al. (2018)	12 countries	Adults		×				
Driva et al. (2016)	Germany	High-school students		×				
Finke et al. (2017)	USA	Adults aged 60+	×					
Fonseca et al. (2012)	USA	Adults		×				
Fuchs-Schündeln et al. (2019)	Germany and UK	Households						×
Herd et al. (2012)	USA	Adults			×			

Authors	Country	Focus group	Socio economic determinants				Financial socialization	Culture
			Age	Gender	Educational	Other		
Jorgensen & Savla (2010)	USA	College students					x	
Jorgensen, Rappleyea, Schweichler, Fang, & Moran, (2017)	USA	Emerging adults college students					x	
Grinstein-Weiss, Spader, Yeo, Taylor, & Books Freeze (2011)	USA	Low- and moderate-income (LMI) homeowners					x	
Grohmann et al. (2015)	Thailand	Adults from the upper-middle income class					x	
Kim et al., (2017)	South-Korea	Native born South-Korean refugees from North Korea living in South Korea						x
Lachance (2014)	USA	Adults					x	
Luhr (2018)	USA	Interviews with 52 parents and adolescents					x	
Longobardi, Pagliuca, & Regoli, (2018)	Italy	15 years old		x				
Lusardi & Mitchell (2007)	USA	Adults aged 50+					x	

Authors	Country	Focus group	Socio economic determinants				Financial socialization	Culture
			Age	Gender	Educa-tion	Other		
Lusardi & Mitchell (2008)	USA	Women aged 50+		×				
Lusardi et al. (2010)	USA	Youth aged between 12–17	×	×	×	×		
Lusardi et al. (2014)	USA	Adults aged 50+	×			×		
Lusardi & Tufano (2015)	USA	Adults	×					
Mahdavi & Horton (2014)	USA	Women with at least a Bachelor degree		×				
Monticone (2010)	Italy	Households				×		
Shim et al. (2010)	USA	First-year college students					×	
Sohn et al. (2012)	South Korea	Adolescents					×	
Tang, Baker, & Peter (2015)	USA	Young adults					×	
Xiao et al. (2015)	USA	Adults	×					

1.5 Financial literacy and its consequences

Financial literacy, and financial knowledge in particular, has an effect on numerous financial outcomes: (1) household financial decisions (e.g. savings, debt management, mortgage choice), (2) retirement planning, (3) investment decisions (e.g. risk-taking, stock market participation, portfolio composition, trading behaviour and investment performance), (4) wealth accumulation, and other domains such as the purchase of life insurance and gambling. Table 2 summarizes the research examining the consequences of financial literacy.

1.5.1 Household financial decisions

The literature documents a positive link between financial literacy and financial decision-making. For example, Babiarz & Robb (2014) indicate that households with higher levels of financial knowledge and confidence in their financial capabilities are more likely to acquire emergency savings amounting to three times their typical monthly expenses. This allows them to better deal with unexpected expenses or income shocks. Moreover, financial literacy is key to promoting domestic saving (Baidoo, Boateng, & Amponsah, 2018).

In addition, financial literacy significantly affects debt behaviour. Financial literacy affects three main characteristics of debt management in particular. Firstly, with respect to the level of debt, Gathergood (2012) demonstrates that British citizens with lower levels of financial literacy usually report higher levels of debt. Sevim, Temizel, & Sayilir (2012) confirm this finding for Turkey: consumers with higher financial literacy are less prone to excessive borrowing.

Secondly, considering the cost of debt, Disney & Gathergood (2013) find that UK citizens with lower financial literacy hold higher shares of high cost credit. This is confirmed by Kim & Lee (2018) who find that financial literacy is negatively related to the use of relatively costly payday loans. Consequently, less literate individuals are confronted with higher borrowing costs. Using data from the US Consumer Finance Monthly (CFM) survey, Huston (2012) shows that those who are financially literate are about twice as likely to pay below average interest rates for both credit cards and mortgage loans.

Thirdly, the literature suggests a relation between financial literacy and the choice of mortgage type, however the evidence is not conclusive. Cox, Brounen, & Neuteboom (2015) observe that for a panel of Dutch households, alternative mortgage products (AMP) such as interest-only loans are more popular among wealthier, older, and more sophisticated households. This contrasts with the findings of Gathergood & Weber (2017a), who state that poor financial literacy increases the likelihood of choosing AMP.

Finally, financial literacy significantly affects the most important financial choice made by households, namely the decision to buy a home. According to Gathergood & Weber (2017b), financial literacy raises the likelihood of home ownership among young households. A one-unit increase in financial literacy increases the likelihood of home-ownership among young households by 5.3%.

1.5.2 Retirement planning

A widely discussed issue is whether financial knowledge positively impacts retirement planning (Lusardi & Mitchell, 2008; van Rooij, Lusardi, & Alessie, 2011b). Researchers have examined this in the United States (Lusardi & Mitchell, 2011b) as well as in many other countries around the world: the Netherlands (Alessie, van Rooij, & Lusardi, 2011), Italy (Fornero & Monticone, 2011; Ricci & Caratelli, 2017), Germany (Bucher-Koenen & Lusardi, 2011), Sweden (Almenberg & Säve-Söderbergh, 2011; Klapper & Panos, 2011), New-Zealand (Crossan, Feslier, & Hurnard, 2011), Japan (Sekita, 2011), Chile (Moure, 2016), Canada (Boisclair, Lusardi, & Michaud, 2017), and China (Niu & Zhou, 2018). Globally, most studies provide evidence for a positive impact of financial literacy on retirement planning. However, there are exceptions: in New-Zealand, Crossan et al. (2011) do not find a significant link between financial sophistication and retirement planning. The strong public universal pension system probably reduces the need for individual retirement planning.

Sometimes financial knowledge plays only a mediating role in the decision of consumers to save for the distant future. Analysing US data, Howlett, Kees, & Kemp (2008) observe that characteristics such as future-orientation have a positive effect on retirement planning only if the individual possesses basic financial knowledge. Furthermore, many long-term saving decisions are not only determined by objective financial knowledge, but also by individuals' perceptions of their own financial literacy. Misperceptions will lead to sub-optimal decisions and a lower willingness to accept financial advice (Anderson, Baker, & Robinson, 2017).

1.5.3 Investment decisions

Financial literacy also affects investment decisions such as risk-taking, stock market participation, portfolio composition, trading behaviour and eventually investment performance.

Risk-taking

There is evidence of a positive relation between financial literacy and risk-taking (Bannier & Neubert, 2016; Liao, Xiao, Zhang, & Zhou, 2017; Wang, 2009). For instance, Wang (2009) who studies the effect of objective and subjective financial knowledge on risk-taking demonstrates that investors' confidence levels; which are supported by objective financial knowledge; trigger risk-taking. Especially, for more sophisticated assets, subjective financial literacy is positively correlated with investing (Bannier & Neubert, 2016). Interestingly, this relation is stronger for men than for women. Moreover, the depth of financial literacy matters, more advanced financial literacy is stronger related to risk-taking than basic financial literacy (Liao et al., 2017).

Stock market participation

Financial literacy is positively associated to stock market participation (e.g. Arrondel, Debbich, & Savignac, 2015; van Rooij et al., 2011a). Van Rooij et al. (2011a) show that Dutch retail investors with lower financial knowledge are less likely to invest in the stock market compared to more sophisticated investors who are better informed. This is confirmed by Arrondel et al. (2015) who demonstrate that stock holding in France is positively associated with financial literacy.

Portfolio composition

Individuals with higher levels of financial knowledge are more likely to hold well diversified portfolios. Using data of Portuguese investors, Abreu & Mendes (2010) show that specific financial knowledge contributes towards an increase in the number of assets in a portfolio. Chu, Wang, Xiao, & Zhang (2017) further demonstrate the effect of financial literacy on household choice between stocks and mutual funds. Their results indicate that households with higher financial literacy are more likely to delegate at least part of their portfolio to experts by investing in mutual funds. In contrast, investors who are overconfident are more likely to hold individual stocks instead of mutual funds.

Trading behaviour and investment performance

Recent studies also examine the effect of financial literacy on investors' trading behaviour (Bellofatto, Hondt, & Winne, 2018; Bianchi, 2018; Guiso & Viviano, 2015). Using a combined dataset of financial literacy measures and information on asset holding and trades of clients from an Italian bank during the Global Financial Crisis, Guiso & Viviano (2015) examine the benefits of financial literacy in turbulent financial markets. In particular, the authors find that more financially literate investors outperform less financially literate individuals in three dimensions. First, they are better able to time the market and leave the market before the crash. Second, they are more likely to follow the prescriptions of CAPM and rebalance more often than those with lower levels of literacy. Third, they have a higher ability to detect conflicts of interest. They are less likely to buy bonds issued and promoted by the financial advisors of their bank when the bank had problems to access the liquidity market.

Bellofatto, Hondt, & Winne (2018) relate the self-reported financial literacy of investors from an online Belgian broker to their actual trading behaviour. Investors who report higher levels of financial literacy tend to invest 'smarter'. In particular, they are less prone to the disposition effect, they hold a smaller portfolio, and they achieve diversification through investment funds holding. Their strategy seems to pay off as they obtain both higher gross and net returns as well as higher excess Sharpe ratios.

Bianchi (2018), analysing administrative data from a large French financial institution study the relationship between financial literacy and portfolio management. One of his key findings is that more literate households hold riskier positions when expected returns are higher, but rebalance more often to hold their risk exposure relatively constant over

time. Hereby they adopt a contrarian strategy more often. Or in other words, compared to less literate households they are more likely to switch their wealth towards funds that have experienced relatively lower returns in the past. This strategy seems to pay off as the more literate households experience approximately 0.4% higher annual returns than the less sophisticated households, relative to an average return of 4.3%.

1.5.4 Wealth

Financial literacy eventually also impacts households' net wealth. The literature provides evidence of a strong positive association between financial literacy and net worth (Banner & Schwarz, 2018; Behrman et al., 2012; van Rooij, Lusardi, & Alessie, 2012). This might be facilitated by two channels. First, stock market participation is higher for more financial literate individuals (van Rooij et al., 2011a). Second, financial literacy is positively related to retirement planning (Lusardi & Mitchell, 2007).

In addition, more financially literate individuals are better able to cope with macroeconomic shocks. Klapper, Lusardi, & Panos (2013), who examine the effects of financial literacy on household behaviour during the global financial crisis of 2008, find that individuals with higher financial literacy are significantly less likely to report experiencing a negative income shock. Moreover, they are more likely to report a higher level of unspent income and are less likely to have low spending capacity.

Considering the long-run effects of the crisis on consumers' private wealth, Bucher-Koenen & Ziegelmeier (2014) that households with lower financial literacy react differently to financial shocks than more literate households. Individuals with lower levels of financial literacy are more prone to sell assets that dropped in value, materializing their losses. Consequently, they fail to profit from market resurgence in the short run, and from the equity premium in the long run.

1.5.5 Other

Finally, the literature documents positive effects of financial literacy in a number of other domains. For example, Lin, Hsiao, & Yeh (2017) find that individuals with higher financial literacy are more likely to purchase life insurance. Lam & Lam (2017) document a negative relation between financial literacy and problematic internet shopping. Finally, Becchetti, Bellucci, & Rossetti (2018) find a negative correlation between gambling and financial literacy.

Table 2. *The effects of financial literacy*

Authors	Country	Household financial decisions	Retirement planning	Investment decisions			Wealth	Other
				Risk-taking	Stock market participation	Portfolio composition		
Abreu & Mendes (2010)	Portugal					×		
Alessie et al. (2011)	The Netherlands		×					
Almenberg & S�ave-S�oderbergh, (2011)	Sweden		×					
Anderson et al. (2017)	USA		×					
Arrondel et al. (2015)	France				×			
Babiarz & Robb (2014)	USA	×						
Baidoo et al. (2018)	Ghana	×						
Bannier & Neubert (2016)	Germany			×				
Bannier & Schwarz (2018)	Germany					×		
Becchetti et al. (2018)	Italy						×	
Behrman et al. (2012)	Chile					×		
Bellofatto et al. (2018)	Belgium						×	
Bianchi (2018)	France						×	

Authors	Country	Household financial decisions	Retirement planning	Investment decisions			Wealth	Other
				Risk-taking	Stock market participation	Portfolio composition		
Boisclair et al. (2017)	Canada		×					
Brent & Ward (2018)	Australia							×
Bucher-Koenen & Lusardi (2011)	Germany		×					
Bucher-Koenen & Ziegelmeyer (2014)	Germany						×	
Chu et al. (2017)						×		
Clark, Lusardi, & Mitchell, (2017a)	USA		×					
Clark, Lusardi, & Mitchell, (2017b)	USA		×					
Cox et al. (2015)	The Netherlands						×	
Crossan et al. (2011)	New Zealand		×					
Disney & Gathergood (2013)	UK						×	
Fornero & Monticone (2011)	Italy		×					

Authors	Country	Household financial decisions	Retirement planning	Investment decisions			Wealth	Other
				Risk-taking	Stock market participation	Portfolio composition		
French & McKillop (2016)	Northern Ireland	×						
Gathergood (2012)	UK	×						
Gathergood & Weber (2017a)	UK	×						
Gathergood & Weber (2017b)	UK	×						
Guiso & Viviano (2015)	Italy			×				
Howlett et al. (2008)	USA		×					
Hsiao & Tsai (2018)	Taiwan							×
Huston (2012)	USA	×						
Kim & Lee (2018)	USA	×						
Klapper & Panos (2011)	Russia		×					
Klapper et al. (2013)	Russia						×	
Lusardi & Mitchell (2007)	USA						×	
Lusardi & Mitchell (2011b)	USA		×					
Liao et al. (2017)	China			×				

Authors	Country	Household financial decisions	Retirement planning	Investment decisions			Wealth	Other
				Risk-taking	Stock market participation	Portfolio composition		
Lin et al. (2017)	Taiwan							x
Moure (2016)	Chile		x					
Niu & Zhou (2018)	China		x		x			
Ricci & Caratelli (2017)	Italy		x					
Sekita (2011)	Japan		x					
Sevim et al. (2012)	Turkey	x						
van Rooij et al. (2011a)	The Netherlands				x			
van Rooij et al. (2011b)	The Netherlands		x					
van Rooij et al. (2012)	The Netherlands							x
Wang (2009)	USA						x	

1.6 Improving financial literacy

1.6.1 Financial education

An obvious way to remedy low levels of financial literacy is to stimulate financial education. Accordingly, initiatives in school as well as in a private context have been taken to enhance individuals' financial knowledge, to stimulate good financial behaviors and to create adequate long-term financial attitudes.

Table 3 provides an overview of a selected number of studies evaluating several education initiatives. As can be seen from the table, the initiatives differ in terms of the target group (e.g. high school students, adults, low-income families) and the channel through which they are offered (e.g. classroom, online, mass media, training at the workplace). Most education initiatives are targeted to high-school students (e.g. Bruhn, de Souza Leão, Legovini, Marchetti, & Zia, 2016; Carlin & Robinson, 2012; Walstad, Rebeck, & MacDonald, 2010). However, there are also researchers who focus on specific vulnerable groups such as low-income families, (Collins, 2013) smallholder farmers (Sayinzoga, Bulte, & Lensink, 2016), or women (Bhutoria & Vignoles, 2018). The classroom setting seems to be the most common channel of financial education in which participants picked up financial knowledge (Batty, Collins, & Odders-White, 2015; Bruhn, Ibarra, & McKenzie, 2014) or improved their financial behaviours (Bruhn et al., 2014; Carlin & Robinson, 2012; Collins, 2013; Sayinzoga et al., 2016). Moreover, there are also employers who take initiatives to enhance the financial skills of their employees. Most of these initiatives aim to promote retirement planning (Bayer, Bernheim, & Scholz, 2009; Bernheim & Garrett, 2003). More recently, in the search for more cost-effective ways of offering financial education, one considers the use of online (Lusardi et al., 2017) or mass media (Berg & Zia, 2017; Crawford, Lajbcygier, & Maitra, 2018).

When measuring the impact of financial education there are generally two options. A first option is to question subjects on their financial literacy skills both before and after the financial education initiative takes place (e.g. Lusardi et al., 2017; Walstad, Rebeck, & MacDonald, 2010). Natural experiments and quasi-experimental designs therefore provide an ideal setting. A second, and widely used option is the use of randomized controlled trial (RCT) experiments (e.g. Bruhn, et al., 2016; Skimmyhorn, 2016) in which the financial literacy scores of treatment and control groups are contrasted. There exist multiple meta-analyses examining the impact of financial education initiatives with somewhat conflicting results (Fernandes, Lynch, & Netemeyer, 2014; Kaiser & Menkhoff, 2017; Miller, Reichelstein, Salas, & Zia, 2015). While Fernandes et al. (2014) find that financial education initiatives only explain 0.1% of the variance in financial behaviours studied, Kaiser & Menkhoff (2017) observe that financial education significantly impacts financial behaviour and even to a larger extent financial knowledge. Miller et al. (2015) furthermore show that financial education can be effective in targeting certain financial behaviours.

The success of financial education depends on a number of factors. First, financial education can only be effective if it is taught by motivated and skilled teachers (Fernandes

Table 3. *Financial education initiatives*

Study	Country	Research design	Target group	Channel
Bernheim & Garrett (2003)	USA	Natural experiment	Employees	Seminars, professional assistance, informative materials
Bayer, Bernheim, & Scholz (2009)	USA	Natural experiment	Employees	Seminars, newsletters
Walstad, Rebeck, & MacDonald, (2010)	USA	Quasi-experiment	High school students	DVD, teacher instructions, classroom lessons
Carlin & Robinson (2012)	USA	Quasi-experiment	High school students	Classroom
Collins (2013)	USA	RCT	Low-income families	Classroom
Bruhn, Ibarra, & McKenzie (2014)	Mexico	RCT	Adults	Classroom
Batty, Collins, & Odders-White, (2015)	USA	RCT	High school students	Classroom
Bruhn, de Souza Leão, Legovini, Marchetti, & Zia (2016)	Brazil	RCT	High school students	Classroom, and take-home exercises
Sayinzoga, Bulte, & Lensink (2016)	Rwanda	RCT	Smallholder farmers	Classroom
Skimmyhorn (2016)	USA	Natural experiment	New enlistees of the US Army	Classroom
Berg & Zia (2017)	South Africa	RCT	Adults	Mass media
Lusardi et al. (2017)	USA	Natural experiment	Adults	Online
Supanantaroeck, Lensink, & Hansen (2017)	Rwanda	RCT	High school students	Classroom
Berry, Karlan, & Pradhan (2018)	Ghana	RCT	Primary and junior high school students	Classroom
Bhutoria & Vignoles (2018)	India	RCT	Women	Training in the context of a self-help group
Crawford, Lajbcygier, & Maitra, (2018)	Cambodia	RCT	Factory workers	Mass media

et al., 2014; Lusardi & Mitchell, 2014). Second, the initiatives take into account the heterogeneity of individuals (Lusardi & Mitchell, 2014). Finally, the design of the program has to be appropriate. Amagir et al. (2018) argue that “experimental learning” is a promising method to teach financial literacy to children and adolescents in primary and secondary school. In college, where students increasingly start making their own financial decisions, initiatives adapted to specific “life events” seems to be more effective.

1.6.2 Financial advice

Financial education as a means to address low financial literacy has received strong governmental support. However, as argued by Willis (2011), not everyone has needs to be a financial expert. Like other forms of human capital, financial literacy has both costs and benefits (Jappelli & Padula, 2013). Consequently, for some financially illiterate individuals with high information and search costs, it might be more cost-efficient to make use of financial advice instead of enhancing their own financial literacy.

Whether financial advice serves as a substitute for financial literacy or not depends on how likely it is that less literate individuals seek advice from a financial advisor (Stolper & Walter, 2017). Using data from indebted consumers in the UK, Disney, Gathergood, & Weber (2015) find that for a given debt problem, a one-unit increase in financial literacy reduces the likelihood of seeking assistance from a credit counsellor by approximately 60%. However, there is not always a clear link between objective measures of financial literacy and advice seeking. For a sample of Dutch households Kramer (2016) finds no significant relation between objective financial literacy and financial advice seeking. Instead, he reveals a negative relation between subjective measures of financial literacy and advice seeking. More specifically, he finds that the most confident households ask for financial advice half as often as the least confident.

One potential reason why individuals are reluctant to access financial advice is financial advisor anxiety. Sometimes individuals are anxious to consult a financial advisor due to embarrassment or worry associated with the consultation process. Gerrans & Hershey (2017) find a clear negative relationship between financial advisor anxiety and the decision to seek financial advice.

1.7 Conclusion

This chapter concludes by highlighting avenues for future research. First, the majority of the studies focus primarily on financial knowledge when measuring financial literacy. Comparing levels of financial literacy across countries is only valid when attention has been paid to all aspects of financial literacy. While financial knowledge is an important aspect of financial literacy, it can only affect financial well-being when translated into proper financial behaviour. The intention to engage in this behaviour is determined by an individual’s financial attitudes.

Second, in addition to the current focus on socio-economic determinants of financial literacy, more research is needed on social and cultural aspects related to financial literacy. Culture and financial socialization play a crucial role in the formation of attitudes and certain behaviours. For instance, in some European countries it is quite common to save, while in others it is not. Children learn to save at a young age, from their parents. Furthermore, cultural aspects determine the way in which society is shaped and how the need for financial literacy is experienced. The latter may explain the remaining heterogeneity in financial literacy levels across countries after controlling for socio-economic factors.

Finally, research should look more into the potential for financial education to incite behavioural changes. A combined use of discrete choice experiments (DCE) and randomized control trials (RCT) would enable us to investigate behavioural changes set in motion by financial education.

References

- Abreu, M., & Mendes, V. (2010). Financial literacy and portfolio diversification. *Quantitative Finance*, 10(5), 515–528.
- Agnew, S., & Cameron-Agnew, T. (2015). The influence of consumer socialisation in the home on gender differences in financial literacy. *International Journal of Consumer Studies*, 39(6), 630–638.
- Agnew, S., Maras, P., & Moon, A. (2018). Gender differences in financial socialization in the home – An exploratory study. *International Journal of Consumer Studies*, 42(3), 275–282.
- Alessie, R., van Rooij, M., & Lusardi, A. (2011). Financial literacy and retirement preparation in the Netherlands. *Journal of Pension Economics and Finance*, 10(4), 527–545.
- Almenberg, J., & Säve-Söderbergh, J. (2011). Financial literacy and retirement planning in Sweden. *Journal of Pension Economics and Finance*, 10(4), 585–598.
- Amagir, A., Groot, W., Maassen van den Brink, H., & Wilschut, A. (2018). A review of financial-literacy education programs for children and adolescents. *Citizenship, Social and Economics Education*, 17(1), 56–80.
- Anderson, A., Baker, F., & Robinson, D. T. (2017). Precautionary savings, retirement planning and misperceptions of financial literacy. *Journal of Financial Economics*, 126(2), 383–398.
- Arrondel, L., Debbich, M., & Savignac, F. (2015). Stockholding in France: the role of financial literacy and information. *Applied Economics Letters*, 22(16), 1315–1319.
- Babiarz, P., & Robb, C. A. (2014). Financial literacy and emergency saving. *Journal of Family and Economic Issues*, 35(1), 40–50.
- Baidoo, S. T., Boateng, E., & Amponsah, M. (2018). Understanding the determinants of saving in Ghana: Does financial literacy matter? *Journal of International Development*, 30(5), 886–903.
- Balloch, A., Nicolae, A., & Philip, D. (2015). Stock market literacy, trust, and participation. *Review of Finance*, 19(5), 1925–1963.
- Bannier, C. E., & Neubert, M. (2016). Gender differences in financial risk taking: The role of financial literacy and risk tolerance. *Economics Letters*, 145 (August), 130–135.
- Bannier, C. E., & Schwarz, M. (2018). Gender- and education-related effects of financial literacy and confidence on financial wealth. *Journal of Economic Psychology*, 67 (August), 66–86.
- Batty, M., Collins, J. M., & Odders-White, E. (2015). Experimental evidence on the effects of financial education on elementary school students' knowledge, behavior, and attitudes. *Journal of Consumer Affairs*, 49(1), 69–96.

- Batty, M., Collins, J. M., O'Rourke, C., & Odders-White, E. (2017). Experiential financial literacy: A field study of my classroom economy. *Working paper*. Retrieved from https://www.ssc.wisc.edu/~jmcollin/wp/wp-content/uploads/2015/05/Boulder_MCE.pdf
- Bayer, P. J., Bernheim, B. D., & Scholz, J. K. (2009). The effects of financial education in the workplace: Evidence from a survey of employers. *Economic Inquiry*, 47(4), 605–624.
- Becchetti, L., Bellucci, D., & Rossetti, F. (2018). Gamblers, scratchers and their financial education. *Economia Politica*, 35(1), 127–162.
- Behrman, J. R., Mitchell, O. S., Soo, C. K., & Bravo, D., (2012). How financial literacy affects household wealth accumulation. *American Economic Review: Papers and Proceedings*, 102(3), 300–304.
- Bellofatto, A., D'Hondt, C., & De Winne, R. (2018). Subjective financial literacy and retail investors' behavior. *Journal of Banking and Finance*, 92 (July), 168–181.
- Berg, G., & Zia, B. (2017). Harnessing emotional connections to improve financial decisions: Evaluating the impact of financial education in mainstream media. *Journal of the European Economic Association*, 15(5), 1025–1055.
- Bernheim, B. D., & Garrett, D. M. (2003). The effects of financial education in the workplace: Evidence from a survey of households. *Journal of Public Economics*, 87(7–8), 1487–1519.
- Berry, J., Karlan, D., & Pradhan, M. (2018). The impact of financial education for youth in Ghana. *World Development*, 102 (February), 71–89.
- Bhutoria, A., & Vignoles, A. (2018). Do financial education interventions for women from poor households impact their financial behaviors? Experimental Evidence from India. *Journal of Research on Educational Effectiveness*, 11(3), 409–432.
- Bianchi, M. (2018). Financial literacy and portfolio dynamics. *The Journal of Finance*, 73(2), 831–859.
- Boisclair, D., Lusardi, A., & Michaud, P. C. (2017). Financial literacy and retirement planning in Canada. *Journal of Pension Economics and Finance*, 16(3), 277–296.
- Brent, D. A., & Ward, M. B. (2018). Energy efficiency and financial literacy. *Journal of Environmental Economics and Management*, 90 (July), 181–216.
- Brown, M., Henchoz, C., & Spycher, T. (2018). Culture and financial literacy: Evidence from a within-country language border. *Journal of Economic Behavior and Organization*, 150 (June), 62–85.
- Bruhn, M., de Souza Leão, L., Legovini, A., Marchetti, R., & Zia, B. (2016). The impact of high school financial education: Evidence from a large-scale evaluation in Brazil. *American Economic Journal: Applied Economics*, 8(4), 256–295.
- Bruhn, M., Ibarra, G. L., & McKenzie, D. (2014). The minimal impact of a large-scale financial education program in Mexico City. *Journal of Development Economics*, 108 (May), 184–189.
- Bucher-Koenen, T., Alessie, R., & Lusardi, A. (2017). Women, confidence, and financial literacy. *Working paper*. Retrieved from <https://gflec.org/wp-content/uploads/2017/04/ALESSIE-Paper-Cherry-Blossom-2017.pdf?x70028>
- Bucher-Koenen, T., & Lusardi, A. (2011). Financial literacy and retirement planning in Germany. *Journal of Pension Economics and Finance*, 10(4), 565–584.
- Bucher-Koenen, T., Lusardi, A., Alessie, R., & van Rooij, M. (2017). How financially literate are women? An overview and new insights. *Journal of Consumer Affairs*, 51(2), 255–283.
- Bucher-Koenen, T., & Ziegelmeier, M. (2014). Once burned, twice shy? Financial literacy and wealth losses during the financial crisis. *Review of Finance*, 18(6), 2215–2246.
- Calvet, B. L. E., Campbell, J. Y., & Sodini, P. (2009). Measuring the financial sophistication of households. *American Economic Review*, 99(2), 393–398.
- Carlin, B. I., & Robinson, D. T. (2012). What does financial literacy training teach us? *The Journal of Economic Education*, 43(3), 235–247.
- Chen, H., & Volpe, R. P. (2002). Gender differences in personal financial literacy among college students. *Financial Services Review*, 11, 289–307.

- Christelis, D., Jappelli, T., & Padula, M. (2010). Cognitive abilities and portfolio choice. *European Economic Review*, 54(1), 18–38.
- Chu, Z., Wang, Z., Xiao, J. J., & Zhang, W. (2017). Financial literacy, portfolio choice and financial well-being. *Social Indicators Research*, 132(2), 799–820.
- Clark, R., Lusardi, A., & Mitchell, O. S. (2017a). Employee financial literacy and retirement plan behavior: A case study. *Economic Inquiry*, 55(1), 248–259.
- Clark, R., Lusardi, A., & Mitchell, O. S. (2017b). Financial knowledge and 401(k) investment performance: A case study. *Journal of Pension Economics and Finance*, 16(3), 324–347.
- Collins, J. M. (2013). The impacts of mandatory financial education: Evidence from a randomized field study. *Journal of Economic Behavior and Organization*, 95 (November), 146–158.
- Cox, R., Brounen, D., & Neuteboom, P. (2015). Financial literacy, risk aversion and choice of mortgage type by households. *Journal of Real Estate Finance and Economics*, 50(1), 74–112.
- Crawford, A., Lajbcygier, P., & Maitra, P. (2018). Financial education via television comedy. *Applied Economics Letters*, 25(20), 1407–1410.
- Crossan, D., Feslier, D., & Hurnard, R. (2011). Financial literacy and retirement planning in New Zealand. *Journal of Pension Economics and Finance*, 10(4), 619–635.
- Cupák, A., Fessler, P., Schneebaum, A., & Silgoner, M. (2018). Decomposing gender gaps in financial literacy: New international evidence. *Economics Letters*, 168 (July), 102–106.
- DeLiema, M., Deevy, M., Lusardi, A., & Mitchell, O. S. (2018). Financial fraud among older Americans: Evidence and implications, *NBER Working Paper Series*, No. 24803.
- Disney, R., & Gathergood, J. (2013). Financial literacy and consumer credit portfolios. *Journal of Banking and Finance*, 37(7), 2246–2254.
- Disney, R., Gathergood, J., & Weber, J. (2015). Credit counseling: A substitute for consumer financial literacy? *Journal of Pension Economics and Finance*, 14(4), 466–491.
- Driva, A., Lührmann, M., & Winter, J. (2016). Gender differences and stereotypes in financial literacy: Off to an early start. *Economics Letters*, 146 (September), 143–146.
- Fernandes, D., Lynch, J. G., & Netemeyer, R. G. (2014). Financial literacy, financial education, and downstream financial behaviors. *Management Science*, 60(8), 1861–1883.
- Finke, M. S., Howe, J. S., & Huston, S. J. (2017). Old age and the decline in financial literacy. *Management Science*, 63(1), 213–230.
- Fonseca, R., Mullen, K. J., Zamarro, G., & Zissimopoulos, J. (2012). What explains the gender gap in financial literacy? The Role of household decision making. *Journal of Consumer Affairs*, 46(1), 90–106.
- Fornero, E., & Monticone, C. (2011). Financial literacy and pension plan participation in Italy. *Journal of Pension Economics and Finance*, 10(4), 547–564.
- French, D., & McKillop, D. (2016). Financial literacy and over-indebtedness in low-income households. *International Review of Financial Analysis*, 48 (December), 1–11.
- Fuchs-Schündeln, N., Masella, P., & Paule-Paludkiewicz, H. (2019). Cultural determinants of household saving behaviour. *Journal of Money, Credit and Banking*, In press, 1–36.
- Gathergood, J. (2012). Self-control, financial literacy and consumer over-indebtedness. *Journal of Economic Psychology*, 33(3), 590–602.
- Gathergood, J., & Weber, J. (2017a). Financial literacy, present bias and alternative mortgage products. *Journal of Banking and Finance*, 78 (May), 58–83.
- Gathergood, J., & Weber, J. (2017b). Financial literacy: A barrier to home ownership for the young? *Journal of Urban Economics*, 99, 62–78.
- Gerrans, P., & Hershey, D. A. (2017). Financial adviser anxiety, financial literacy, and financial advice seeking. *Journal of Consumer Affairs*, 51(1), 54–90.
- Grinstein-Weiss, M., Spader, J., Yeo, Y. H., Taylor, A., & Books Freeze, E. (2011). Parental transfer of financial knowledge and later credit outcomes among low- and moderate-income homeowners. *Children and Youth Services Review*, 33(1), 78–85.
- Grohmann, A., Kouwenberg, R., & Menkhoff, L. (2015). Childhood roots of financial literacy. *Journal of Economic Psychology*, 51, 114–133.

- Gudmunson, C. G., & Danes, S. M. (2011). Family financial socialization: Theory and critical review. *Journal of Family and Economic Issues*, 32(4), 644–667.
- Guiso, L., Sapienza, P., & Zingales, L. (2006). Does culture affect economic outcomes? *Journal of Economic Perspectives*, 20(2), 23–48.
- Guiso, L., & Viviano, E. (2015). How much can financial literacy help? *Review of Finance*, 19(4), 1347–1382.
- Hastings, J. S., Madrian, B. C., & Skimmyhorn, W. L. (2013). Financial literacy, financial education, and economic outcomes. *Annual Review of Economics*, 5(1), 347–373.
- Herd, P., Holden, K., & Su, Y. T. (2012). The links between early-life cognition and schooling and late-life financial knowledge. *Journal of Consumer Affairs*, 46(3), 411–435.
- Howlett, E., Kees, J., & Kemp, E. (2008). The role of self-regulation, future orientation, and financial knowledge in long term financial decisions. *Journal of Consumer Affairs*, 42(2), 223–242.
- Hsiao, Y. J., & Tsai, W. C. (2018). Financial literacy and participation in the derivatives markets. *Journal of Banking and Finance*, 88 (March), 15–29.
- Hsu, J. W. (2016). Aging and strategic learning: The impact of spousal incentives on financial literacy. *Journal of Human Resources*, 51(4), 1036–1067.
- Hung, A., Parker, A. M., & Yoong, J. (2009). Defining and measuring financial literacy. *RAND Working Paper Series*, No. 708.
- Huston, S. J. (2010). Measuring financial literacy. *The Journal of Consumer Affairs*, 44(2), 296–316.
- Huston, S. J. (2012). Financial literacy and the cost of borrowing. *International Journal of Consumer Studies*, 36(5), 566–572.
- Jappelli, T., & Padula, M. (2013). Investment in financial literacy and saving decisions. *Journal of Banking and Finance*, 37(August), 2779–2792.
- Jorgensen, B. L., Rappleyea, D. L., Schweichler, J. T., Fang, X., & Moran, M. E. (2017). The financial behavior of emerging adults: A family financial socialization approach. *Journal of Family and Economic Issues*, 38(1), 57–69.
- Jorgensen, B. L., & Savla, J. (2010). Financial literacy of young adults: The importance of parental socialization. *Family Relations*, 59(4), 465–478.
- Kaiser, T., & Menkhoff, L. (2017). Does financial education impact financial literacy and financial behavior, and if so, when? *The World Bank Economic Review*, 31(3), 611–630.
- Kim, K. T., & Lee, J. (2018). Financial literacy and use of payday loans in the United States. *Applied Economics Letters*, 25(11), 781–784.
- Kim, M., Choi, S., & Lee, J. (2017). Economic system and financial literacy: Evidence from North Korean refugees. *Emerging Markets Finance and Trade*, 53(11), 2505–2527.
- Klapper, L., Lusardi, A., & Panos, G. A. (2013). Financial literacy and its consequences: Evidence from Russia during the financial crisis. *Journal of Banking and Finance*, 37(10), 3904–3923.
- Klapper, L., Lusardi, A., & van Oudheusden, P. (2015). *Financial literacy around the world: Insights from the Standard & Poor's Ratings Services Global Financial Literacy Survey*. Retrieved from https://responsiblefinanceforum.org/wp-content/uploads/2015/12/2015-Finlit_paper_17_F3_SINGLES.pdf
- Klapper, L., & Panos, G. A. (2011). Financial literacy and retirement planning: the Russian case. *Journal of Pension Economics and Finance*, 10(4), 599–618.
- Kramer, M. M. (2016). Financial literacy, confidence and financial advice seeking. *Journal of Economic Behavior and Organization*, 131(November), 198–217.
- Lachance, M.-E. (2014). Financial literacy and neighborhood effects. *Journal of Consumer Affairs*, 48(2), 251–273.
- Lam, L. T., & Lam, M. K. (2017). The association between financial literacy and problematic internet shopping in a multinational sample. *Addictive Behaviors Reports*, 6(December), 123–127.

- Liao, L., Xiao, J. J., Zhang, W., & Zhou, C. (2017). Financial literacy and risky asset holdings: evidence from China. *Accounting and Finance*, 57(5), 1383–1415.
- Lin, C., Hsiao, Y. J., & Yeh, C. Y. (2017). Financial literacy, financial advisors, and information sources on demand for life insurance. *Pacific Basin Finance Journal*, 43(June), 218–237.
- Longobardi, S., Pagliuca, M. M., & Regoli, A. (2018). Can problem-solving attitudes explain the gender gap in financial literacy? Evidence from Italian students' data. *Quality and Quantity*, 52(4), 1677–1705.
- Luhr, S. (2018). How social class shapes adolescent financial socialization: Understanding differences in the transition to adulthood. *Journal of Family and Economic Issues*, 39(3), 457–473.
- Lusardi, A. (2012). Numeracy, financial literacy, and financial decision-making. *Numeracy*, 5(1), 1–12.
- Lusardi, A. (2015). Risk Literacy. *Italian Economic Journal*, 1(1), 5–23.
- Lusardi, A., & Mitchell, O. S. (2007). Baby boomer retirement security: the roles of planning, financial literacy, and housing wealth. *Journal of Monetary Economics*, 54(1), 205–224.
- Lusardi, A., & Mitchell, O. S. (2008). Planning and financial literacy: How do women fare? *American Economic Review*, 98(2), 413–417.
- Lusardi, A., & Mitchell, O. S. (2011a). Financial literacy around the world: An overview. *Journal of Pension Economics & Finance*, 10(4), 497–508.
- Lusardi, A., & Mitchell, O. S. (2011b). Financial literacy and retirement planning in the United States. *Journal of Pension Economics and Finance*, 10(4), 509–525.
- Lusardi, A., & Mitchell, O. S. (2014). The economic importance of financial literacy: Theory and evidence. *Journal of Economic Literature*, 52(1), 5–44.
- Lusardi, A., Mitchell, O. S., & Curto, V. (2010). Financial literacy among the young. *Journal of Consumer Affairs*, 44(2), 358–380.
- Lusardi, A., Mitchell, O. S., & Curto, V. (2014). Financial literacy and financial sophistication in the older population. *Journal of Pension Economics and Finance*, 13(4), 347–366.
- Lusardi, A., Samek, A., Kapteyn, A., Glinert, L., Hung, A., & Heinberg, A. (2017). Visual tools and narratives: New ways to improve financial literacy. *Journal of Pension Economics and Finance*, 16(3), 297–323.
- Lusardi, A., & Tufano, P. (2015). Debt literacy, financial experiences, and overindebtedness. *Journal of Pension Economics and Finance*, 14(4), 332–368.
- Mahdavi, M., & Horton, N. J. (2014). Financial knowledge among educated women: Room for improvement. *Journal of Consumer Affairs*, 48(2), 403–417.
- Miller, M., Reichelstein, J., Salas, C., & Zia, B. (2015). Can you help someone become financially capable? A meta-analysis of the literature. *World Bank Research Observer*, 30(2), 220–246.
- Monticone, C. (2010). How much does wealth matter in the acquisition of financial literacy? *Journal of Consumer Affairs*, 44(2), 403–422.
- Moure, N. G. (2016). Financial literacy and retirement planning in Chile. *Journal of Pension Economics and Finance*, 15(2), 203–223.
- Nicolini, G., Cude, B. J., & Chatterjee, S. (2013). Financial literacy: A comparative study across four countries. *International Journal of Consumer Studies*, 37(6), 689–705.
- Niu, G., & Zhou, Y. (2018). Financial literacy and retirement planning: Evidence from China. *Applied Economics Letters*, 25(9), 619–623.
- OECD. (2014). *PISA 2012 Results: Students and money: Financial literacy skills for the 21st century*. Paris: OECD Publishing.
- OECD. (2016). *OECD/INFE International survey of adult financial literacy competencies*. Paris: OECD Publishing.
- OECD. (2017). *PISA 2015 results: Students' financial literacy*. Paris: OECD Publishing.
- Potrich, A. C. G., Vieira, K. M., & Kirch, G. (2018). How well do women do when it comes to financial literacy? Proposition of an indicator and analysis of gender differences. *Journal of Behavioral and Experimental Finance*, 17(March), 28–41.

- Remund, D. L. (2010). Financial literacy explicated: The case for a clearer definition in an increasingly complex economy. *Journal of Consumer Affairs*, 44(2), 276–295.
- Ricci, O., & Caratelli, M. (2017). Financial literacy, trust and retirement planning. *Journal of Pension Economics and Finance*, 16(1), 43–64.
- Sayinzoga, A., Bulte, E. H., & Lensink, R. (2016). Financial literacy and financial behaviour: Experimental evidence from rural Rwanda. *Economic Journal*, 126(594), 1571–1599.
- Sekita, S. (2011). Financial literacy and retirement planning in Japan. *Journal of Pension Economics and Finance*, 10(4), 637–656.
- Sevim, N., Temizel, F., & Sayilir, Ö. (2012). The effects of financial literacy on the borrowing behaviour of Turkish financial consumers. *International Journal of Consumer Studies*, 36(5), 573–579.
- Shim, S., Barber, B. L., Card, N. A., Xiao, J. J., & Serido, J. (2010). Financial socialization of first-year college students: The roles of parents, work, and education. *Journal of Youth and Adolescence*, 39(12), 1457–1470.
- Skimmyhorn, W. (2016). Assessing financial education: Evidence from boot camp. *American Economic Journal: Economic Policy*, 8(2), 322–343.
- Sohn, S., Joo, S., Grable, J. E., Lee, S., & Kim, M. (2012). Adolescents' financial literacy: The role of financial socialization agents, financial experiences, and money attitudes in shaping financial literacy among South Korean youth. *Journal of Adolescence*, 35(4), 969–980.
- Stolper, O. (2018). It takes two to Tango: Households' response to financial advice and the role of financial literacy. *Journal of Banking and Finance*, 92, 295–310.
- Stolper, O. A., & Walter, A. (2017). Financial literacy, financial advice, and financial behavior. *Journal of Business Economics*, 87(5), 581–643.
- Supanantarook, S., Lensink, R., & Hansen, N. (2017). The impact of social and financial education on savings attitudes and behavior among primary school children in Uganda. *Evaluation Review*, 41(6), 511–541.
- Tang, N., Baker, A., & Peter, P. C. (2015). Investigating the disconnect between financial knowledge and behavior: The role of parental influence and psychological characteristics in responsible financial behaviors among young adults. *Journal of Consumer Affairs*, 49(2), 376–406.
- Van Campenhout, G. (2015). Revaluing the role of parents as financial socialization agents in youth financial literacy programs. *The Journal of Consumer Affairs*, 49(1), 186–222.
- van Ooijen, R., & van Rooij, M. C. J. (2016). Mortgage risks, debt literacy and financial advice. *Journal of Banking and Finance*, 72, 201–217.
- van Rooij, M., Lusardi, A., & Alessie, R. (2011a). Financial literacy and stock market participation. *Journal of Financial Economics*, 101(2), 449–472.
- van Rooij, M., Lusardi, A., & Alessie, R. (2011b). Financial literacy and retirement planning in the Netherlands. *Journal of Economic Psychology*, 32(4), 593–608.
- van Rooij, M., Lusardi, A., & Alessie, R. (2012). Financial literacy, retirement planning, and household wealth. *The Economic Journal*, 122(560), 449–478.
- Walstad, W. B., Rebeck, K., & MacDonald, R. (2010). The effects of financial education on the financial knowledge of high school students. *Journal of Consumer Affairs*, 44(2), 336–357.
- Wang, A. (2009). Interplay of investors' financial knowledge and risk taking. *Journal of Behavioral Finance*, 10(4), 204–213.
- Willis, L. E. (2011). The financial education fallacy. *American Economic Review*, 101(3), 429–434.
- Xiao, J. J., Chen, C., & Sun, L. (2015). Age differences in consumer financial capability. *International Journal of Consumer Studies*, 39(4), 387–395.