Expertise
and insight
for the future

Vitor da Rocha Natalino Monteiro

The Impact and Efficiency of Financial Literacy Education in Early Life

Metropolia University of Applied Sciences

Bachelor of Business Administration

European Business Administration

Bachelor's Thesis

11 April 2020

Metropolia
University of Applied Sciences

Author	Vitor da Rocha Natalino Monteiro
Title	The Impact and Efficiency of Financial Literacy Education in Early Life
Number of Pages	36 pages + 1 appendices
Date	11 April 2020
Degree	Bachelor of Business Administration
Degree Programme	European Business Administration
Instructor/Tutor	Adriana Mustelin, Senior Lecturer

This research paper has as main objective to find the effects of financial literacy programmes in schools and for the general population, how or if that can be measured and if they are effective or not.

Using mainly secondary data – with a mix of quantitative and qualitative methods – publicly available from the OECD and the PISA examinations from 2012, 2015, and 2018 and other governmental agencies surveys across the globe to see if financial literacy programmes are effective, and if so, how early they can be implemented, and what the curricula should contain.

The results from previous researches and analyses, have shown that financial literacy programmes do work in certain levels and regarding certain skills and also vary accordingly to socio-economic factors. There is a very weak correlation between financial literacy and financial behaviour, but strong correlation with investment and retirement planning, while numeracy plays a bigger role in financial decisions.

It can be concluded that despite being important, financial literacy does not explain financial and consumer behaviour, and a psychological factor needs to be considered in order for programmes to measure and implement it more efficiently.

Keywords	finance; literacy; financial literacy; financial education; personal finance; childhood; PISA; numeracy;

Contents

1 Introduction

The demographic shift faced by most developed countries is slowly putting a burden in their economies, which will eventually lead to a deficit on their social security systems. More and more countries are raising their minimum retirement age, with the average in Europe ranging from 65 to 68 years, furthermore, some countries are linking the retirement age with life expectancy (ETK 2019). In addition to the very low or negative fertility rates, more people will become responsible for managing their own retirement savings plan in order to provide a well-established cash flow after they stop working. That means making life changing choices in their early years that will have a huge impact on their finances later and being able to make smart financial decisions as early as possible will have positive impacts in their future lives.

In the past years, the subject of personal finance has raised interest and gained state-run programs in countries like Australia, Canada, France, Japan, USA and the UK (US Treasury 2006), due to an increase in the complexity and variety of products offered in the markets and as the population pyramid of the developed countries constrict, i.e. low fertility and mortality rates and increased life expectancy, people can expect longer contribution times for retirement, decreased benefits, etc., making it harder for people with low income to even be able to retire. Financial literacy is a skill that can help the consumer protect its own interests and manage its own money by making the smart and right judgement and plan for their future.

Consumer debt is also constantly increasing – countries like Australia, Canada and Denmark, all have over 100 per cent of household debt as a % of GDP – and therefore, more and more young people have been burdened with student and credit card debts as they try to start families or buy a house (Valckx 2017). Governments have started scaling back benefits of social security programs supported by the state, and more employers started moving away from defined benefit (DB) plans[1] towards defined contribution (DC) plans[2].

[1] An employer-sponsored retirement plan where employee benefits are computed using a formula that considers several factors, such as length of employment and salary history (Kagan 2019).
[2] A retirement plan that is typically tax-deferred, in which employees contribute a fixed amount or a percentage of their pay checks to an account that is intended to fund their retirements (Hayes 2020).

2 Literature review

Multiple studies and papers try to prove or disprove the efficiency of financial literacy programs for students. An important part of the studies is understanding the proposals relative to financial literacy, how they can be applied, if they work as expected, and if it is really necessary. The OECD officially recognised the importance of financial literacy in 2002, and started its financial literacy program in 2003, with the objective to analyse the financial education programmes in schools and measure the efficiency of the initiatives intended for children and teenagers in some of their member states and other non-state members. In 2008 the project was further enhanced with the creation of the OECD International Network on Financial Education (OECD/INFE). (OECD 2017)

The first report they produced pointed out a few key challenges of incorporating financial education into school's curricula. The first was to convince politicians and the major decision makers about the importance of the subject and how to add an extra subject into the curricula. The second key challenge was if the subject should be compulsory or optional in the curricula. Back in 2008, in the United States for example, only three states required at least one course of personal finances per semester. In Canada, the subject was mandatory in a few provinces and compulsory in others. In Northern Ireland, primary and high schools had it as a compulsory part of the mathematics curricula. (OECD 2017)

That raised another question which was if the subject should be independent or part of another subject, like mathematics. If independent, that would leave room for increased highlights of the subject core, but if incorporated into an existing subject, would allow it for increased discussion and links between a variety of contexts. And the last two key challenges were, how early children should start learning about it and how to make the topic engaging enough due to the complexity of the subject. (Mundy 2008)

After taking part on financial education programmers, be it in schools or later in life, what is left is how to measure it. Lusardi and Mitchell (2011), developed the big three questions on how to measure financial literacy, and are widely used in over 20 countries across the globe. In their paper "Financial Literacy Around the World: An Overview", they use the "Big Three" to measure financial literacy among individuals in developed and developing economies. They found out that financially literate people are more likely to

save for retirement than their less financially literate peers. The three questions are as follow:

1. Suppose you had $100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow?

2. Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you be able to buy with the money in this account?

3. Please tell me whether this statement is true or false. “Buying a single company’s stock usually provides a safer return than a stock mutual fund.”

The other side of the coin – the ones against financial literacy – say that governments are simply wasting money into something that is fruitless. Mostly because schools and programmes focus on the mechanics of it, i.e. mathematics and facts and figures, ignoring individual behaviour, and the complexity of the financial industry. Furthermore, many studies found little to no correlation between personal finance programmes and improved consumer performance later in life. Without proper and definitive evidence that these programmes are helpful, governments are better off improving the existing education system and focusing on better mathematics education. (Webb 2014)

3 Methodology

This research paper used mainly secondary data, collecting data from the PISA reports going back to 2012 until the latest one in 2018 and results from surveys from multiple countries and government agencies about financial literacy. The PISA measures 3 key skills between 15-year-olds’ students – reading, mathematics and science, and a few selected countries are tested in financial literacy. However, as PISA is only realised every three years, and they change the focus of the core domains, the results might be hard to compare between each version and not always provide a good sample for analysis. That is not to say that the data is not useful, as it can give a good perspective

of the general financial literacy among 15-year-olds from different countries and social backgrounds, and how countries' education systems are dealing with that subject. For further understanding on how to measure financial literacy and its effects, the Lusardi and Mitchell score (2011) was also explored and used extensively, and how the results reflect into people behaviour towards personal finances. The results of the studies vary accordingly to various factors, such as age and social-economic background, and they can be correlated with certain financial behaviours, such as saving for retirement or the likeliness to indebtedness.

4 The financial sector politics and financial liberalisation

The subprime crisis in the USA was the biggest one since the crisis of 1929, and its impacts were felt in other sectors than just the financial. The access to easy credit and the dissemination of "cheap" investments were the root of it. The credit boom was due to mainly three factors: a) the liberalisation of the financial sector and removal of credit restrictions, in particular for consumers; b) falling interest rates; and c) the expectation for higher future incomes from banks, consumers and companies, which led to fast growth in consumption and more lending and borrowing, as seen in Greece during 2012 (Brissimis, Garganas and Hall 2012). A decade before the crisis took place, American banks started lending money to people that had no prospects on paying it back – unemployed, or without regular income, people without assets to offer as collateral, etc. That kind of credit was known as subprime and huge amounts of it were given out then, growing by seven-fold from 1998 to 2005 (Mayer and Pence 2008). Banks started mixing these high-risk obligations with low-risk obligations, creating then new structured and complex products called CDOs[3], that were later sold to investors all around the world, principally in Europe (ECB 2005). Even for the most sophisticated market player, CDOs were obscured and complex, but got advertised as an excellent deal due to its high yield and received good ratings from agencies like Standard & Poor's, Fitch, and Moody's (Krugman 2007).

During the 1970s, financial markets were systematically deregulated, due to the neoliberal or fundamentalist wave post World War II, that believed markets were always efficient, or, at least, more efficient than any intervention by the state (Canova 2000).

[3] A collateralized debt obligation (CDO) is a complex structured finance product that is backed by a pool of loans and other assets and sold to institutional investors (Tardi and Chen 2019).

The internationalisation of the financial system was first discussed in 1997 on the World Trade Organization. The liberalisation of finance covers a set of measures, that in essence deregulate the domestic financial markets, including but not limited to Central Banks autonomy from the government, liberalisation of capital accounts and convertibility of domestic currency, freedom from interest rates and government-imposed interest rates schemes, etc. However, these measures have the effect of strengthening the power of finance over the state, removing policies (monetary, exchange, credit) from the elected government and entrusting them to financiers and other market players like shadow banks[4] who now control an autonomous monetary authority, restricting any action from the state (Patnaik 2011).

There are three general factors behind financial liberalisation: poor results, high costs, and pressure from globalization. The first relates to slow economic growth by inefficient allocation of financial resources, low interest rates, high inflation, and corruption. The second represents the required recapitalization by banks and takeover of their external debts by governments. And the third point, and perhaps the most important, globalization – it created pressure from the growth of trade, travel, and migration, which increased access to international markets and loosened capital control. The general change focused on interest rates, in order to finance budget deficits and enable development with the help of private sector credit (Hanson and Ramachandran 2004).

Due to high globalization and financialisation, banks are no longer the principal agents in finance. The traditional way corporations would reinvest was via bank loans or internal retained earnings, but nowadays they count with new financial channels such as stock markets, investment banks, mutual- hedge- and pension funds, etc. That shift of interest, from operation to dividends and capital gains, transforms the profitability criterion to evaluate corporations through shareholder value, thus employing short-term strategies to accumulate profit to avoid financing long-term projects (Lee, To, Yu 2013).

[4] A shadow bank is a financial intermediary facilitating the creation of credit across the global financial system (Chappelow 2019).

5 Financialisation and the paradox of thrift

Financialisation is defined by Krippner (2005) as a pattern of accumulation in which profits accrue primarily through financial channels rather than through trade and commodity production. Its main impacts are raising the significance of the financial sector relative to the real economy, transfer income from the real economy to the financial sector and increasing income inequality and contributing to wage stagnation (Palley 2007). The impact of consumer financial services expansion works through three main channels:

- economic modernization: a new consumption environment with economies of scale occasioned by the penetration of international retail chains, further amplified by financial liberalisation and rapid banking sector growth, facilitating access to consumer credit and credit cards for several income groups;

- demand for more formal workers: higher demand for formal contracts arise in an environment of financial inclusion, given the requirement of proof of income for access to loans;

- effective government inspection: monitoring payments and expenditures through electronic systems, governments can combat informality by improving regulations and infrastructure, and encourage the use of electronic payment technologies (Aşık 2018, p.3).

There are many critics of financialisation, as its focus is on short-term profits, which in the long run can disrupt a company's long-term goals and stop from offering high quality products and support service (Berger 2014). The US economy also saw a major shift from real economy to the financial sector, while the finance industry grew from 10 to 20 per cent of GDP in a few decades, the manufacturing industry dropped from 30 to 10 per cent of GDP. The health of the economy in the long-term is jeopardised by the pursuit of short-term profits of the financial sector through private equity, corporate raids[5], junk

[5] When an investor acquires a large stake of an apparent undervalued company in order to make changes that will increase share value (Kenton 2019).

bonds[6], extensive credit, and even Ponzi Schemes. The focus was no longer in producing things but making more money from money (Collins 2015).

In the US, after the crash of 1929, the New Deal[7] was designed by US president Franklin D. Roosevelt to help the economy rise again. It lasted roughly half a decade (1933-1939) and was divided in two segments. The first consisted of measures to stabilize the banking system, ensure bank deposit security, and increase confidence in the stock market, the second, and the most important one, introduced government-sponsored retirement plans in the form of social security, while also increasing government employment and minimum wages (Kenton 2019).

Whether to save or spend, has always been the biggest economic question. With the introduction of Keynesian theory, the proper response to an economic recession is more spending and fewer savings. Keynes argued that savings are a net drag on the economy during a recession, since prices do not clear[8] and producers cannot adapt to changing conditions (Chen 2019). The government then should spend money to create jobs, since if they cut spending when people and businesses are doing the same, unemployment gets even worse, since “in the long run we are all dead”, they should spend now and tax later (Keynes 1923). But spending is not free, and cash is finite.

Contrary to Keynesians, free marketeers like Hayek and Friedman, said it is best to be thrifty and save even in difficult times. Real savings should come first if you plan on investing as the market coordinates interest with time. The basic open economy model has too much aggregation and ignores the consumer behaviour and motivation. According to the Austrian business cycle theory, the capital structure is vital and malinvestments[9] can collapse the economy, the boom and bust cycle starts with an expansion of credit and low rates (Mises and Hayek 1974). That new money is then mistaken for real loanable funds (loans, bonds, savings deposits, etc), which can also be derived by increased household savings, driving the interest rates low. But in fact, inflation is the real driver here.

[6] Bonds that carry higher risk of default (Chen 2019).
[7] Series of domestic programs introduced by President Franklin D. Roosevelt in an attempt to end the economic ravages of the Great Depression (Kenton 2019).
[8] Clearing price is the equilibrium monetary value of a traded security, asset, or good, i.e., quantity supplied is equal to quantity demanded (Kenton 2019).
[9] Badly allocated business investments (Kenton 2019).

5.1 Denationalization of money and virtual currencies

In the book by Friedrich Hayek, *The Denationalization of Money* (1976), the author proposed the abolition of any kind of exchange control or regulation of the movement of money between countries. Banks should not use or issue a kind of currency that is less reliable or useful than any other. Hayek believed that one government having the monopoly over one currency was the root of all monetary evil (Hayek 1976). That concept is precisely the one behind Bitcoin[10] and most cryptocurrencies[11], by removing the control from a third party, it gives the people its financial power back. The fundamental nature of money is changing. As we move to a new monetary era, countries and companies look at digital money and assets as a new standard for their monetary systems (Vignas 2019).

While it is a fact that most monopolies are problematic for the economy, some natural monopolies, with government regulated prices – which can be found in the market for public utilities, providing water, electricity, etc – when offer good and continuous supply of said services to the population, can be considered good. Some legal monopolies may be taken over by a government in order to keep costs to consumers to a minimum (Kenton 2019). Because the economy thrives on competition, Hayek argued that the monopoly over currency has the same defects of every other monopoly: one must use it regardless of how unsatisfactory the product was, and it prevents better methods for satisfying a need, for which monopolies have no incentive.

As we move towards a cashless society, Neobanks[12] and Fintechs[13], the concept of money changes and more and more people have access to the banking system without ever needing to go to a bank and new systems substitute the old obsolete ones. Even big names in the bank industry such as Swiss Bank, HSBC, and J.P. Morgan, have recognized the importance and usefulness of Bitcoin technology are moving towards digital currencies or at least acknowledging it. The appeal of cash was its ability to be easily generated and distributed, but unlike virtual currency, it costs sometimes much more than its actual value. For example, some countries still use pennies or one cent

[10] A purely peer-to-peer version of electronic cash, without a central government to rule it (Nakamoto 2009).
[11] Decentralized digital currencies based off Bitcoin, secured by cryptography (Frankenfield 2019).
[12] A type of bank operating 100 per cent digitally, without a physical branch.
[13] Financial technology

coins, the lowest value of a physical currency unit. In the US, to mint one 1 cent coin, it costs 1.5 cents, making it cost more than it is worth. (Close 2016).

6 Household debt effects on the economy

Household debt means money that has been borrowed by individuals, usually from banks or financial institutions, and it includes mortgages, personal and student loans, and credit card balances. The past decade saw a significant rise in household debt in most advanced economies, principally after the crisis of 2007-2008, with the median in the advanced economies rising from 52 to 63 per cent, and in emerging economies from 15 to 21 per cent (Valckx 2017). That increase was due to lower interest rates and easing of liquidity constraints, making the housing sector more sensitive to changes in interest rates, income and asset prices (Debelle 2004). Even though it plays a limited role, it has important implications in macro-financial models, affects household consumption, though it is not the major determinant of it, and it is a good predictor of financial crises and a key determinant of recessions (Schularick and Taylor cited in Lombardi et al. 2017).

In the short run, household debt boosts consumption and GDP growth, however, in the long run, when the household debt-to-GDP ratio exceeds 60 per cent, it generates a negative effect on consumption and after 80 per cent it negatively affects GDP growth (Lombardi et al. 2017). The initial boost happens due to the hiring of more workers in certain industries, but after 3-5 years the highly indebted households need to cut back on spending as the loans repayments start, which consequently drags growth down by reducing economic activity, and as seen in the sub-prime crisis, the declines in house prices can trigger credit defaults that shake the foundations of the financial system (Valckx 2017).

Household debt can also be beneficial, it allows individuals to borrow money to buy durable goods that they would not be able to purchase in one go, like a car, or a house, thus improving their living standards. Additionally, it can provide stability to the economy by smoothing spending during periods of temporary shortfalls (Harari 2018). The cost of borrowing for individuals has also fallen over the past decade, but it still bears its risks.

In the book *This Time is Different* (2009), economists Carmen Reinhart and Kenneth Rogoff, explore eight centuries' worth of financial crises. They analyse the effect of what they called "this-time-is-different syndrome", an unrealistic optimism and confidence in the efficiency of markets and health of the economy. Debt defaults are one common result of financial crises, before the subprime crisis, rising house prices and household debt were justified by central bankers and Wall Street. But until 2008, debt defaults were non-existent (Reinhart and Rogoff, 2009). Understanding why a country default is rather easy in comparison, they include lack of enforcement across national barriers, shift in political powers, and financial contagion – the spread of an economic crisis from one market to another, either in domestic or international level (Ganti 2019).

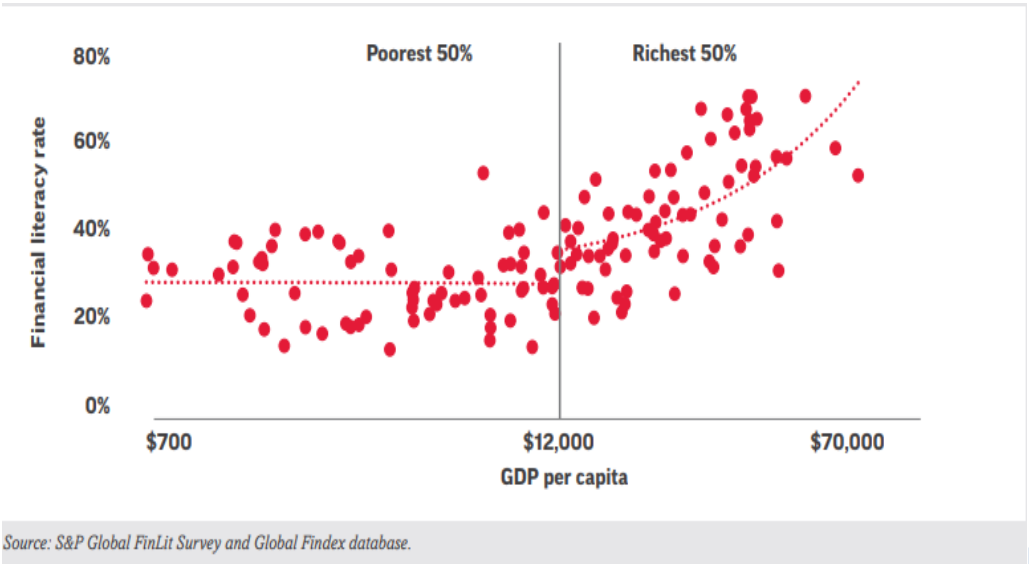
When it comes to people, social mobility[14] plays a big part in that default and in a country economy. In the US for example, is much more expensive to live under the poverty line, as you have to spend more on daily necessities because you cannot afford to buy in bulk (Badger 2016). The fault falls on the financial services, as 8 per cent of American households do not have bank accounts simply because it is too expensive to keep one (The Economist 2015). For families with lower income, the largest portion of their budget is spent on basic necessities, up to 70 per cent of a poor American's income is spent on food, housing, and transportation. After covering the basic expenses, low-income families who only make $15,000 to $20,000 a year on average, will be left with only $1 a day (Thompson 2012). That does not make only harder for living day by day but also to save money to live more comfortably in the future. Approximately 46 per cent of Americans have trouble coming up with $400 to cover emergency expenses and a third of them have never saved a single dollar for retirement (Mui 2016).

However, in 2019, the world gained an astonishing number of 1,146,000 new adults millionaires, according to a wealth report from Credit Suisse, with the US being responsible for 675,000 of them, almost 59 per cent (Winck 2019). According to paper by New York University, the number of households with a net worth of 1 million dollars grew from 2.4 million in 1983 to 9.1 million in 2016, a growth rate of 279 per cent (Ingraham 2017). The net worth is measured using the households' assets, such as stocks, home value, retirement accounts, etc, minus the total debt. But with the middle class being squeezed between the top and the bottom of the income spectrum, that

[14] The movement of individuals, families, or groups through a system of socioeconomic factors such as waelth, income, social status, education, etc (Mirriam-Webster 2020, stratify entry).

means inequality is dangerously growing, principally when the top 1 per cent of the wealthiest Americans own 40 per cent of the country's wealth and twice as much as the bottom 90 per cent combined (Wolff 2017). Regardless of the number of millionaires created each day, too much inequality can depress economic growth, by crippling education opportunities for children from poor socio-economic backgrounds, reducing social mobility, and hampering skills development. Children from the bottom of the income spectrum tend to miss on pricey educational opportunities, that makes them less productive employees, which means lower wages and overall participation in the economy (Ingraham 2018).

In richer countries, financial literacy tends to be higher, as seen in the picture below. However, the relationship only holds when looking at the richest 50 per cent of economies. In these economies, around 38 per cent of the variation in financial literacy rates can be explained by differences in income. For the poorer half, below $12,000 of GDP per capita, there is no evidence that income is associated with financial literacy. Meaning that national-level policies, related to education and consumer protection, are more likely the cause for modelling financial literacy in these economies more than any other factor (Klapper, Lusardi and Oudheusden 2015).



Picture 1 How high economic development is tied to high financial literacy (2014).

Financial knowledge is strongly associated to household wealth, according to a paper published in the National Bureau of Economic Research – NBER, and those with little to

no knowledge of how finances and the economy work are more likely to find themselves in debt, usually with high interest loans. Because of the change from DB plans towards DC plans in the 1980s, employees are expected to make smart decisions about their finances, but at the same time financial markets become more and more complex (Lusardi, Michaud and Mitchell 2013). According to an annual report by the Social Security Administration, the US is going through the biggest shortfall since the early 1980s, during the Reagan era, and is now drawing down its assets to fully pay retirees benefits while projecting its reserve funds will be completely depleted in 15 to 16 years (Rappeport 2019).

7 Measuring financial literacy and its efficiency around the world

The OECD INFE defines financial literacy and capability as “a combination of awareness, knowledge, skill, attitude and behaviour necessary to make sound financial decisions and ultimately achieve individual financial wellbeing” (OECD 2011). In late 2005, the Organization for Economic Co-operation and Development (OECD) published an international study surveying financial literacy in OECD countries. The study showed that many consumers do not have an adequate understanding of either their financial needs or of financial instruments and products (Hecklinger 2006). In March 2008, the OECD launched the International Gateway for Financial Education, which aimed to help consumers deal with the complexity of financial decisions (OECD 2017).

In Japan, 71 per cent of respondents lacked knowledge about bonds and equities, 57 per cent lacked knowledge of financial products in general, and 29 per cent lacked knowledge of insurance and pensions. In South Korea, where household debt is closing the 100 per cent of their GDP according to a financial stability report by the Bank of Korea (BOK) (Reuters Editorial 2018), high school students that took a financial survey about how to manage a credit card failed to answer 60 per cent of the questions correctly (Hecklinger, 2006). Yet, they rank as first in numeracy and literacy skills among the OECD countries.

Financial illiteracy is not exclusive for poor or developing countries were financial markets are less developed and while it is important to assess how literate (or illiterate)

people are, it is still very difficult to prove how people process certain economic information and then make smart financial decisions (Lusardi and Mitchell 2011). There are however challenges to learning, first because the human mind is not a computer and information cannot be stored arbitrarily, it requires relevance and usefulness to our current circumstances. Second, the complexity of the subject can be highly counterintuitive for some people. For example, the concept of compound interest, it is a nonlinear function expressed by $A = P\left(1 + \frac{r}{n}\right)^{nt}$, which is calculated using exponential functions, i.e. the more you save, the more it grows, because the interest accrued in the period before earns additional interest in the next period (Chen 2019). By plugging in some numbers in the compound interest equation, a simple initial investment of € 1000 with annual addition of € 1200 (extra € 100 added every month), and a rate of only 5 per cent, will have a future value of € 8238,58 in 5 years, it may not sound much, but that is € 1258,58 that has been "created" by simply letting the investment grow. That can also be increased with higher return percentages and increased annual additions to the principal investment. The third challenge is the mismatch between what people know and what they think they know, underconfidence and overconfidence on what people know tend to make people choose poorly, as shown in a recent study, where participants in a financial literacy course were tested six months after completing the course. Their objective knowledge, or how much they actually knew, was no higher than before the course because most concepts had faded. But their subjective knowledge, or how much they knew based on direct experience and interpretation, remained the same (Fernbach and Sussman 2018).

In a survey conducted in the UK, with over two thousand adults within work-age, almost 4 in 5 adults have low level of numeracy. The survey explored the definitions of numeracy and its relation to financial capabilities, how attitudes, especially confidence, affects this relationship, and which groups suffer most from the lack it. The report found that skills and literacy are not the only components of it, the mindset of each individual plays an important role too. In particular how confident they are in their abilities (Money Advice Service 2017).

Financial decisions often involve dealing with numbers, and math is not always the forte of the average population. Other difficulty is projecting the decisions into the future, such as how much money the individual will need in retirement, can a more expensive asset

like a house or a car be afforded given their current income and expenses, or if their expenses will grow compared to their earnings (Fernbach and Sussman 2018). Because of the reasons presented, among others, traditional financial education fails, in the sense that it does not remove the psychological barriers involved in financial decisions. However, that does not mean that it is completely unnecessary. Some people argue that certain concepts, like *just-in-time teaching* (JiTT)[15], for example, are better for this kind of situation because financial knowledge declines over time, and JiTT address that situation. The central problem with it though, is that it is hard to implement, for instance, it is not easy to identify who will be looking for a home early enough to reach them at the right moment that precedes the purchase, and at the same time make them receptive to new information, but still early enough in the process that they will have room to alter their decision-making (Fernbach and Sussman 2018). When it comes to financial decisions, just-in-time might be too late.

8 Is financial literacy necessary?

To some, teaching personal finance to students is both a waste time and money, for two simple reasons: the first, most courses present situations that most students will only have to deal with years from now and might become irrelevant by the time they do; the second, it does not change behaviour, giving people information do not necessarily change the way they act (Ogden 2019). The National Assessment of Adult Literacy (NAAL) in the United States, defined literacy as the domination of reading and writing techniques in terms of consciousness, to understand and recognize words, focusing on everyday tasks. There are two components to it: the first one is about mechanics, the second about practical application. There is however, a third part, which is not always addressed: the psychological, or behavioural side. Understanding the mechanics and the math, does not necessarily make one an expert in managing money (NAAL 2003).

The results of financial education programmes have proven to be consistently positive; people's financial knowledge is boosted when questioned before and after taking the courses. Sadly, the results change when their actions are measured instead (Ogden 2019). A working paper from Harvard Business School, showed that there was no effect for financial education in savings behaviour between people that took mandate personal

[15] A teaching and learning strategy designed to promote the use of class time for more active learning (Novak et al. 1999).

finance courses and the ones that did not and that additional math courses lead to better economic outcomes (Cole, Paulson and Shastry 2014). Quality financial decision making, can be linked to financial literacy and cognitive capabilities, however, there is little evidence that education designed specifically for that purpose is actually successful. It is hard to separate the impact of financial literacy from other factors associated with poor financial outcomes (Cole, Paulson and Shastry 2014).

While numeracy is important and relevant for students during the course of their studies, most adults will never have the need for solving complicated equations or trigonometric problems, and therefore students do not always see its relevance to life (Ganem 2013). On the other hand, most people come in contact with financial decisions during early adulthood, be it by saving money, planning for retirement, taking on a loan, or filing taxes. Also, because the financial industry is filled with clever people that usually make things complicated in order to take advantage of the less knowing customer, by making their customers more aware of the dangers will only create more and more complex products and ways to take even more advantage (Webb 2014). Yet, studies show that there is strong correlations between financial literacy and investment and retirement planning, and it should not be completely neglected. But it is still hard to come to a consensus as to what teach in the curriculum at school, as the financial knowledge varies highly according to country, economic background, and if people experienced things more recently such as inflation, risk diversification, and economic crisis, which became the three key factors in the Lusardi and Mitchell score (Lusardi and Mitchell 2011).

The number of students enrolled in tertiary education institutions has increased significantly in the last 30 years, which can be explained by the higher demand from companies for skilled workers, making higher education a requirement for many jobs. As the number of student debt grows worldwide, countries started seeking solutions to that. Even in countries like Sweden and Finland, where universities have no tuition, approximately 70 per cent of students will borrow an average of €18000 (Gundy and Musto 2019).

9 Should kids start learning about money?

When people talk about investing, and when you should do it, the usual answer is now or as soon as possible. Of course, there are several factors taken into consideration, but principally how much of outstanding debt you possess and if you have built an emergency fund, which according to experts is between three to six months' worth of expenses. When it comes to kids, money can be as tricky as any other subject considered a taboo, make it difficult to make engagement, or for a lack of enough knowledge from the parents (Apatoff 2019). Parents do not need to be sophisticated investors to understand enough about finance to be financially healthy. Being financially healthy means understanding the difference between good debt and bad debt and how to avoid crushing credit card debt, the importance of saving often and early for retirement (Frazier 2019).

For humans, childhood lasts longer than most species, because children learn by observing, experimenting and asking questions, and require more information in order to survive and thrive (Vugt 2017). When it comes to money, it is not that different. According to personal finance commentator and journalist, Beth Kobliner, children's money habits are set by the age of 7 and by the age of 3 they can already grasp basic money concepts (Kobliner 2018). The challenge is how to make the lessons more engaging and how to apply them to everyday life.

The first step to teach children about money is to start with the value of money. Basic concepts such as earning, spending and saving can be introduced in early stages of the children development when they start grasping concepts such as counting. Using piggy banks, for example, is a great start, mostly because coins and paper feel more real to kids (Cheng 2017). Cash tells kids that money is finite, and even though we live in an era where "plastic money" is very real (Kobliner 2018).

In some families, is very common for parents to give their children allowances as a way to introduce them to money. The concept is simple and can teach the child the importance of earning something – the more chores or tasks they complete, more rewards they will get, that will help from an early age to connect working and being paid. It is usually the first step toward financial literacy, as long as parents know how to make

it a teachable moment (Lynch 2019). Allowing children to have their own money can help them to manage and create budgets and to perceive the real value of money. However, simply giving children an allowance does not teach them anything about money (Pearl and Morris 2010). Saving money is hard because it is a skill, and as most skills, it takes discipline, time and repetition to perfect it. In October 2019, a telephone survey conducted by the AICPA (American Institute of Certified Public Accountants) in the US, with 1002 parents found that a high percentage (75 per cent) of parents believe that allowances are important to teach kids about value of money and financial responsibility, however, only 3 per cent said their kids save their allowances.

As children grow, their perception of money changes, and it is usually tied to material things. Making them pay for their own things, such as candy or a birthday gift for a friend, can teach them the concepts of wants and needs. Author Robert Kiyosaki tells in his book *Rich Dad, Poor Dad* (2017) how he learned about money from the age of 9 during the late 1950s. His rich dad used *Monopoly,* the famous boardgame, to teach him basic concepts, such as taxation, what is an asset, etc. and even today, the ideas behind the game can be used to learn more about money and its value.

While growing up, most kids will acquire their knowledge from school, and what they do not learn in school will generally be taught by their moms and dads. When it comes to finance and money habits, that is not always the best solution as proved by a study in 2017 from T. Rowe Price. The '*Parents, Kids & Money Survey*', sampled 1014 parents and analysed behaviours associated with kids' financial habits. It found that positive financial habits were linked to parents' decisions on how to let their children save or spend money on their own. On the other hand, children with troubling financial habits were more frequent when their parents also struggled with money. They do not need to know from an early life about complex structured products, risk management, or how equity funds work, these are very specific things that not everyone is exposed to and might only be way later in their adult life. But to avoid making the same mistakes of their elders, and to live financially fit lives, they need to be taught the essentials about money (Kobliner, 1996).

Adolescence is the stage of life in which most people will form real values regarding money, its benefits and the problems it brings. The average 13-year-old in the 21st

century has way easier access to information than their parents or grandparents had 30 years ago. Not to mention the emergence of Fintechs and finance apps. The way consumers shop also has changed, cash is being used less and less, and online shopping is now the preferred choice for many (Frazier 2019). But that technology revolution has its cons. The constant pressure from social media and friends can shape their personality and particularly the way they deal with money. In that moment, it is crucial that parents or guardians, teach correctly how to deal with money so future problems can be reduced. Learning about savings, budgeting, paying bills on time, avoiding too much costly debt, and how credit card debt works should also be emphasized in a school curriculum (Cole, Paulson and Shastry 2014).

The effects of financial literacy education in high school continues to influence attitudes and behaviours toward money management well after graduation. As student loan debts continue to rise, and finances remain the number one reason students drop out of school, making sure they know how to budget, and handle debt is critical (Malcolm 2014). A study – released by EverFi and sponsored by Higher One – surveying 65,000 college students, showed that the first-year students who were required to take financial literacy courses in high school were significantly more financially responsible than their peers who did not. There were also significant disparity based on age, race, gender and the type of institutions they attended. Traditional financial education focuses primarily on providing simple financial knowledge and reactionary tools, without accounting for a student's individual attitudes, motivation and behaviours. Education institutions must provide educational programs early on that take into consideration differences in attitudes, behaviours, and demographics (Business Wire 2014).

10 How literacy and numeracy affect financial decisions

Childhood financial attitudes, habits and norms are developed between the ages of 6 and 12, yet most schools do not teach finance that earlier or it simply does not belong to the curriculum. Studies show that proper implemented financial education programs can improve credit scores and lower the probability of delinquency for young adults (Frazier 2019). According to the UNESCO, over 600 million children and adolescents, aged 6-11 in primary schools, and aged 12-14 in lower secondary schools, around the world are

not achieving minimum proficiency levels (MPLs) in reading and mathematics (UNESCO 2017). Literacy and numeracy skills are very important skills in a modern globalized world. What information people know, how they understand that information, and what they do with that information has a major impact on their lives.

In a recent meta-analysis of 188 different studies, researchers analysed the role of financial literacy and education on financial behaviour, and the result was staggering; financial literacy could only explain 0.1 per cent of the variance in financial behaviour (Fernandes et al. cited in Skagerlund et al 2018). The researchers suggested that an unknown variable, such as cognitive ability, could be driver behind the correlation of the effect of financial literacy on financial behaviour. That would explain why the majority of personal finance courses lack efficiency, despite the agreement that financial literacy plays an important part in financial behaviour and wellbeing.

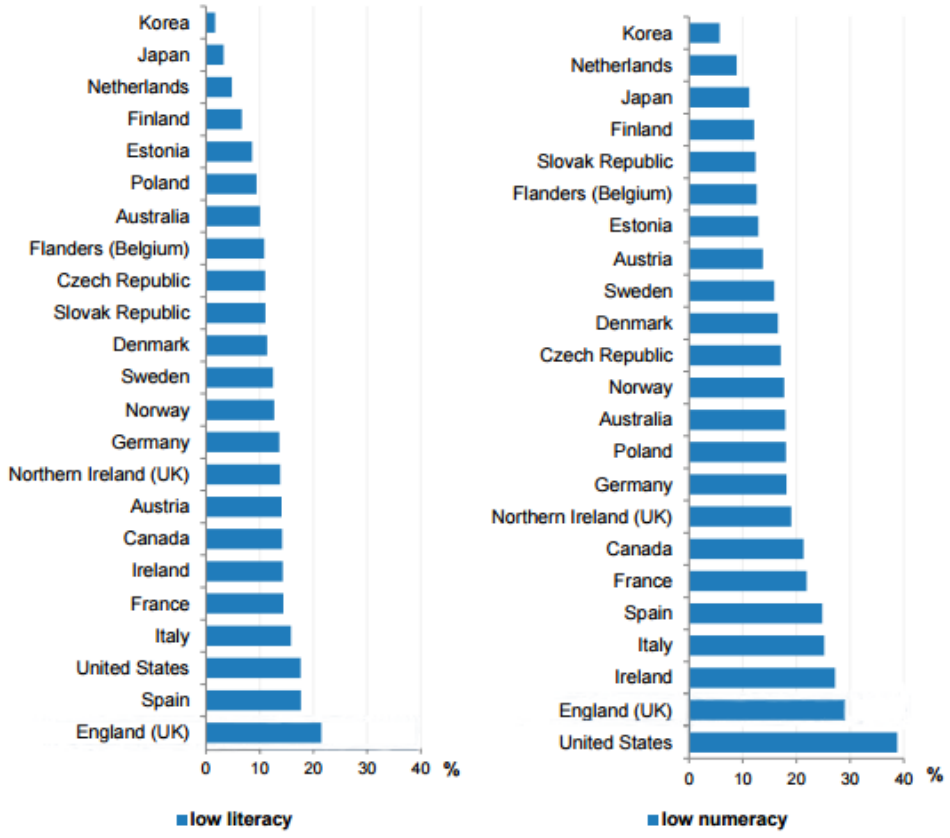
Certain demographic groups, such as women, the elderly, and those with low educational attainment, are more affected with the lack of numeracy, and that has potential consequences for individuals and societies as a whole (Lusardi 2012). When it comes to gender differences, women are more likely to indicate they do not know the answer to a question and also less likely to answer financial literacy questions correctly. That is usually associated to a lack of confidence in financial knowledge rather than lack of actual knowledge (Lusardi and Mitchell 2011). However, in the results from PISA 2015, only in Italy, boys do perform better than girls in financial literacy (OECD 2015). For those with low educational attainment, there are large differences particularly in numeracy, as economic deprivation in early childhood affects not only their development but also their future outcomes in life (Brooks-Gunn and Duncan 1997).

Financial decisions – be they related to asset building, debt management or retirement planning – require the capacity to do calculations, including, but not exclusively, some complex ones. Yet, how numerate individuals are, in particular when it comes to calculations related to finance is the important question (Lusardi 2012). People encounter numbers on a daily basis, comparing prices, splitting bills, checking the right change, etc. To some, these are simple tasks and are completed without any deliberation. However, that is not true for everyone. Numeracy, in particular, is specially lacking among those with low educational attainment (Lusardi and Mitchell cited in

Lusardi 2012). The disparity in the data sets are also large among African Americans and Hispanic groups in the United States, where they display the lowest level of numeracy.

There is a strong correlation between numeracy and financial decisions or outcomes, for example how individuals with better financial literacy are more likely to participate in financial markets and to invest in stocks (Lusardi 2012). Financial literacy has also been correlated with cognitive abilities and linked to a set of behaviours related to saving, wealth, and portfolio choice (Lusardi Mitchell 2011). Furthermore, the authors found that individuals that are able to do more complex calculations, such as compound interest, are much more likely to plan for retirement in the Netherlands, and in Italy and Russia, those who are able to do such calculations are more likely to participate in pension plans. And in China, learning interest compounding lead to a sizeable increase in pension contributions (Song 2011 cited in Lusardi 2012).

As seen in picture 2, South Korea have the highest levels of literacy and numeracy among OECD countries. In 2012, 66 per cent of 25-34-year olds had attained tertiary education, an increment from 37 per cent in 2000. The United States comes in last place, with almost 40 per cent of the teenagers scoring below Level 2 on numeracy, and the UK comes last in literacy, with over 20 per cent of teenagers ranking below Level 2 (see Appendix 1). (Luxton 2016)



Note: Adults who obtained their highest qualification outside the host country: those with foreign qualifications and 1st generation migrants, who obtained their highest qualification prior to entering the host country, are excluded.

Source: OECD calculations based on the Survey of Adult Skills (PIAAC) (2012) (database).

Picture 2 Percentage of 16 to 19-year-olds with low literacy and numeracy (below Level 2)

Every three years, the Programme for International Student Assessment (PISA)[16] is performed, they test countries students in reading, mathematics and science, and some

[16] PISA is the OECD's Programme for International Student Assessment. The tests are designed to gauge how well the students master key subjects in order to be prepared for real-life situations in the adult world (OECD 2018).

countries participate in financial literacy and global competence tests. The results from PISA show that maths literacy has increased during 2015 in most developed countries, with some averaging higher than the OECD average score, as seen in Picture 3 below

National Center for Education Statistics

Table M1. Average scores of 15-year-old students on the PISA mathematics literacy scale, by education system: 2015

Education system	Average score	s.e.	Education system	Average score	s.e.
OECD average	490 ▲	0.4	Israel	470	3.6
Singapore	564 ▲	1.5	**United States**	**470**	**3.2**
Hong Kong (China)	548 ▲	3.0	*Croatia*	464	2.8
Macau (China)	544 ▲	1.1	*Buenos Aires (Argentina)*	456	6.9
Chinese Taipei	542 ▲	3.0	Greece	454 ▼	3.8
Japan	532 ▲	3.0	*Romania*	444 ▼	3.8
B-S-J-G (China)	531 ▲	4.9	*Bulgaria*	441 ▼	4.0
Korea, Republic of	524 ▲	3.7	*Cyprus*	437 ▼	1.7
Switzerland	521 ▲	2.9	*United Arab Emirates*	427 ▼	2.4
Estonia	520 ▲	2.0	Chile	423 ▼	2.5
Canada	516 ▲	2.3	Turkey	420 ▼	4.1
Netherlands	512 ▲	2.2	*Moldova, Republic of*	420 ▼	2.5
Denmark	511 ▲	2.2	*Uruguay*	418 ▼	2.5
Finland	511 ▲	2.3	*Montenegro, Republic of*	418 ▼	1.5
Slovenia	510 ▲	1.3	*Trinidad and Tobago*	417 ▼	1.4
Belgium	507 ▲	2.4	*Thailand*	415 ▼	3.0
Germany	506 ▲	2.9	*Albania*	413 ▼	3.4
Poland	504 ▲	2.4	Mexico	408 ▼	2.2
Ireland	504 ▲	2.1	*Georgia*	404 ▼	2.8
Norway	502 ▲	2.2	*Qatar*	402 ▼	1.3
Austria	497 ▲	2.9	*Costa Rica*	400 ▼	2.5
New Zealand	495 ▲	2.3	*Lebanon*	396 ▼	3.7
Vietnam	495 ▲	4.5	*Colombia*	390 ▼	2.3
Russian Federation	494 ▲	3.1	*Peru*	387 ▼	2.7
Sweden	494 ▲	3.2	*Indonesia*	386 ▼	3.1
Australia	494 ▲	1.6	*Jordan*	380 ▼	2.7
France	493 ▲	2.1	*Brazil*	377 ▼	2.9
United Kingdom	492 ▲	2.5	*Macedonia, Republic of*	371 ▼	1.3
Czech Republic	492 ▲	2.4	*Tunisia*	367 ▼	3.0
Portugal	492 ▲	2.5	*Kosovo*	362 ▼	1.6
Italy	490 ▲	2.8	*Algeria*	360 ▼	3.0
Iceland	488 ▲	2.0	*Dominican Republic*	328 ▼	2.7
Spain	486 ▲	2.2			
Luxembourg	486 ▲	1.3			
Latvia	482 ▲	1.9			
Malta	479 ▲	1.7	**U.S. states and territories**		
Lithuania	478 ▲	2.3	*Massachusetts*	500 ▲	5.5
Hungary	477	2.5	*North Carolina*	471	4.4
Slovak Republic	475	2.7	*Puerto Rico*	378 ▼	5.6

▲ Average score is higher than U.S. average score at the .05 level of statistical significance.
▼ Average score is lower than U.S. average score at the .05 level of statistical significance.
NOTE: Education systems are ordered by 2015 average score. The OECD average is the average of the national averages of the OECD member countries, with each country weighted equally. Scores are reported on a scale from 0 to 1,000. Standard error is

Picture 3 Average scores of 15-year-old students on the PISA mathematics literacy (OECD 2015)

Some of the countries listed are also currently ranking highest with the largest debt in the world, including Japan, South Korea, Portugal and Spain. All five Nordic countries can also be seeing in the results, with most of them averaging higher than the OECD average and increased scores from the previous test.

Roughly 10 per cent of students across OECD countries and economies are proficient in financial literacy, ranking at the Level 5. They can analyse complex financial products and understand a wide range of financial terms and concepts, solve non-routine financial problems (those concerned with developing reasoning power and creativity to solve problems), understand the wider financial landscape, such as income tax, explain different types of investments, and describe potential outcomes of financial decisions (OECD 2015). Socio-economically disadvantaged students are more likely to perform lower in financial literacy, after accounting for performance in mathematics and reading. The average score of advantaged students is 89 points higher than their disadvantaged counterparts, that is equivalent to more than one level of the PISA proficiency (OECD 2015).

Note: Statistically significant differences are shown in a darker tone.
Countries and economies are ranked in descending order of the score-point difference between actual and expected performance.
Source: OECD, PISA 2015 Database, Table IV.3.11.

Picture 4 Relative performance in financial literacy. Actual and expected performance

In each round of PISA, one of the core domains is tested in detail, taking up nearly two-thirds of the total testing time (OECD 2017). Since its first edition in the 2000s, the test rotates the focus of the assessment among the three categories, reading, mathematics, and science literacy. The PISA 2018 was focused in 'reading literacy'. Because of the shift between the emphasis of the test among the core subjects, it might be difficult to compare the results of PISA 2018 and earlier versions, as seen in the table below taken from OECD library.

Comparison	Reading	Mathematics	Science
PISA 2000 to 2018	4.04		
PISA 2003 to 2018	7.77	2.80	
PISA 2006 to 2018	5.24	3.18	3.47
PISA 2009 to 2018	3.52	3.54	3.59
PISA 2012 to 2018	3.74	3.34	4.01
PISA 2015 to 2018	3.93	2.33	1.51

Note: Comparisons between PISA 2018 scores and previous assessments can only be made to when the subject first became a major domain or later assessment cycles. As a result, comparisons of mathematics and science performance between PISA 2000 and PISA 2018, for example, are not possible.

Source: *PISA 2018 Technical Report* (OECD, forthcoming[3]).

Table 1 Link errors for comparisons between PISA 2018 and previous assessments https://doi.org/10.1787/888934028957

The head of the education division at the OECD, Andreas Schleicher, has mentioned several times that the future editions of the PISA, will try to focus on more than just academics, and to try and encourage countries to view education beyond traditional subjects, including PISA 2021 will assess students creative thinking (Anderson and Shendruk 2019).

Higher numeracy is also linked to how prone individuals are to save for retirement and be more successful in their planning, and less likely to be behind their mortgage payments or experience foreclosure (Lusardi and Mitchel 2011). It is also known that numeracy is linked to financial capabilities and wellbeing, and it is particularly relevant to people's abilities to build longer-term financial security. The most helpful behaviours that a person can have to help improve their financial wellbeing are effective use of credit active saving, budgeting, resilience and working towards goals (The Money Advice Service 2017).

Demographic factors are also relevant when it comes to numeracy and financial literacy. Numeracy tends to decline with age, be it by cognitive abilities or low level of knowledge, it is notable how the elderly show a greater predominance of financial mistakes (Lusardi 2012).

11 Conclusion

The need to educate oneself about finances has produced significant changes of young students and their families. According to analysts from the World Bank (2013), in the report 'The impact of high school financial education – experimental evidence from Brazil', with 20,000 high school students, found an increase of 1 per cent in savings level of young people who went through the program; 21 per cent more students write down expenses every month; 4 per cent more students negotiate prices and means of payment when making a purchase. Families were also benefited, as issues such as budget, planning and bank fees entered the agenda of conversations and joint spending decisions because of their kids' homework. The report also concludes that this result indicates that financially educated young people can contribute to the growth of the country's GDP. In Brazil where the default rates are growing and affect over 60 million people, approximately 30 per cent of the population, having a stable financial life, without gaps in the monthly budget and balanced expenses, is the dream of many (Agência Brasil 2020).

Regardless if financial literacy could be the answer to personal financial crises around the globe, there is still controversy whether it leads to effective financial attitudes or not. The general accepted model starts by introducing the kind of education that would eventually lead to financial literacy, changed financial attitudes and more effective financial behaviour (Alsemgeest 2015). People are very different from one another, as each act and experience a certain level of interest, anxiety and behaviour towards personal financial management (Fünfgeld and Wang, 2008, as cited in Alsemgeest). Consumer behaviour is also constantly subject to change, be it by changes in technology, environment, or unforeseen crises, such as the COVID-19 pandemic in the beginning of 2020.

Moreover, according to data from the OECD, governments are spending less with public education which leaves students choosing private institutions instead, that are usually costly and need to take on loans to finance their studies (OECD 2016). The struggle is even higher among student from rural areas and poorer families. Only 1 in 10 students in the OECD area were able to distinguish between fact and opinion (OECD 2019). Children from wealthier families will always find open doors to a successful life, but children from poor families have often just one single chance in life and that is a good school education that gives them their opportunity to develop their potential. Those who miss that window rarely catch up, because later educational opportunities in life tend to reinforce early education outcomes (OECD 2019).

Social inclusion still plays a big part in the development and education of children. In the Chinese provinces of Beijing, Shanghai, Jiangsu and Zhejiang – which came on the top in the latest PISA – the 10 per cent socially most disadvantaged students, showed better reading skills than the average student in the OECD area, and performed as well as the 10 per cent most advantaged students in those countries (OECD 2019). And the reality is that in many countries, the ZIP code still remains a powerful predictor for the success of students and schools.

When the costs of studying and living grow faster than inflation, it requires students and families to be more and more savvy about finances and how to manage their debt more adequately (Lusardi 2012). With that in mind, there is a clear need for personal finance education of university or high school students, however, the data with respect to the success of said courses is somewhat scarce. That is due to the fact that most programmes cannot be efficiently measured in the short term, as financial decisions usually will only be visible in the future.

In the short term, financial education programmes are proven to be very efficient when it comes to measuring the knowledge of the individuals, yet, they all fail to measure consumer behaviour in relation to financial decision making. In order to understand consumer financial decisions, it is of utmost importance to understand how individuals actually make decisions. Impulses, precipitated thinking, and overconfidence can all cloud an individual's thinking. People also tend to overestimate their financial knowledge,

which distorts their financial capabilities and as a result, their economic and financial decisions. (BBVA 2017)

Changes in knowledge and attitudes to individuals and their possible repercussions on financial behaviour require a longer time to mature. Particularly, these effects tend to appear after inclusion in the labour market, when people start earning income and making financial decisions more autonomously. In addition, there are indications that interactions with financial products make people learn more about them. Meaning that a small initial gap in financial education programs in schools can be leveraged over time.

References

Agência Brasil 2020. 'Número de inadimplentes cresceu em Novembro de 2019' (Number of defaulters grew in November 2019), São Paulo. <https://agenciabrasil.ebc.com.br/economia/noticia/2020-01/numero-de-inadimplentes-cresceu-em-novembro-de-2019>.

Alsemgeest, L. 2015. 'Arguments for and against financial literacy education: where to go from here?', *International Journal of Consumer Studies*, 39, DOI 10.1111/ijcs.12163

Anderson, J. & Shendruk, A. 2019. *The best students in the world, charted*, viewed 20 March 2020, <https://qz.com/1759506/pisa-2018-results-the-best-and-worst-students-in-the-world/>.

Apatoff, A. 2019. *How Do I Talk to My Kid About Money?,* viewed 01 November 2019, <https://people.com/parents/talking-to-kids-about-money/>.

Aşık, G. A. 2018. 'Overlooked benefits of consumer credit growth: impact on formal employment', *IZA Journal of Labor Policy,* https://doi.org/10.1186/s40173-018-0100-1

Badger, E. 2016. 'Why the poor pay more for toilet paper — and just about everything else', *The Washington Post,* 8 March*,* viewed 08 February 2020,

<https://www.washingtonpost.com/news/wonk/wp/2016/03/08/why-the-poor-pay-more-for-toilet-paper-and-just-about-everything-else/>.

BBVA 2017. *How to change people's behaviour through financial education,* viewed 28 March 2020, <https://www.bbva.com/en/change-peoples-behavior-financial-education/>.

Brissimis, S. N., Garganas, E. N. & Hall, S. G. 2012. 'Consumer credit in an era of financial liberalisation: An overreaction to repressed demand?', *Applied Economics*, 46:2, 139-152, DOI: 10.1080/00036846.2013.835482.

Brooks-Gunn, J. & Duncan G. J. 1997. 'The Effects of Poverty on Children', *JSTOR,* vol. 7, No. 2, Children and Poverty (Summer – Autumn, 1997), pp. 55-71, viewed 19 February 2020, <http://pdfs.semanticscholar.org/08aa/8e3f8e2220865b06bbc9449726a38e22c3bd.pdf>.

Bruhn, M., de Souza, L. L., Legovini, A., Marchetti, R., Zia, B. 2013. The impact of high school financial education: experimental evidence from Brazil (English). Policy Research working paper; no. WPS 6723; Impact Evaluation series; no. IE 109. Washington, DC: World Bank Group. <http://documents.worldbank.org/curated/en/753501468015879809/The-impact-of-high-school-financial-education-experimental-evidence-from-Brazil>.

Business Wire 2014. *Survey of 65,000 College Students Shows Need for High School Financial Literacy Requirement*, viewed 07 March 2020, <https://www.businesswire.com/news/home/20140408006082/en/Survey-65000-College-Students-Shows-High-School>.

Chappelow, J. 2019. *Shadow Banking System,* viewed 08 February 2020, <https://www.investopedia.com/terms/s/shadow-banking-system.asp>

Chen, J. 2019. *John Maynard Keynes,* viewed 23 October 2019, <https://www.investopedia.com/terms/j/john_maynard_keynes.asp>.

—— 2019. *What Is Compounding?,* viewed 12 December 2019, <https://www.investopedia.com/terms/c/compounding.asp>.

Cheng, M. 2018. 'Financial Literacy Is The Greatest Gift Of All', *Forbes,* 18 June, viewed 16 October 2019, <https://www.forbes.com/sites/margueritacheng/2018/06/18/financial-literacy-is-the-greatest-gift-of-all/#5198fb0169c3>.

Cole, S., Paulson, A. & Shastry, G. K. 2014. *High School Curriculum and Financial Outcomes: The Impact of Mandated Personal Finance and Mathematics Courses,* Boston: Harvard Business School.

Collins, M. 2015. Wall Street And The Financialization Of The Economy, *Forbes,* 04 February, viewed 01 December 2019 <https://www.forbes.com/sites/mikecollins/2015/02/04/wall-street-and-the-financialization-of-the-economy/#4ec254ef5783>.

ETK – Finnish Centre for Pensions – Eläketurvakeskus 2019. *Retirement ages in different countries,* viewed 10 December 2019, <https://www.etk.fi/en/the-pension-system/international-comparison/retirement-ages/>.

Fernbach, P. & Sussman, A. 2018. *Teaching people about money doesn't seem to make them any smarter about money – here's what might,* viewed 22 February 2020, <https://www.marketwatch.com/story/financial-education-flunks-out-and-heres-whats-being-done-about-it-2018-10-10 >.

Frankenfield, J. 2019. *Cryptocurrency*, viewed 23 January 2020, <https://www.investopedia.com/terms/c/cryptocurrency.asp>.

Frazier, L. 2019. *Beyond Piggy Banks & Lemonade Stands: How to Teach Young Kids About Finance (and They're Never too Young),* Rowman & Littlefield Publishers, Maryland.

Ganem, J. 2013. *Financial Literacy: Making Math Relevant,* viewed 30 November 2019, <http://www.thedailyriff.com/articles/financial-literacy-making-math-relevant-313.php>.

Gundy, D. & Musto, P. 2019. *Growing Global Student Debt Fuels Search for Solutions,* viewed 08 December 2019 <https://learningenglish.voanews.com/a/growing-global-student-debt-fuels-search-for-solutions/5157022.html>.

Hanson, J. & Ramachandran, S. 2004. *Financial Liberalization: What Went Right, What Went Wrong?* <https://pdfs.semanticscholar.org/80b0/0a150d27ffa59fd9853812778fa445911b0d.pdf>

Hayes, A. 2019. *Dutch Tulip Bulb Market Bubble Definition,* viewed 02 November 2019, <https://www.investopedia.com/terms/d/dutch_tulip_bulb_market_bubble.asp>.

—— 2019. *Adverse Selection,* viewed 29 November 2019, <https://www.investopedia.com/terms/a/adverseselection.asp>.

Hecklinger, R. E. 2006. *Financial Literacy,* London: New Statesman.

History - Roaring Twenties 2018. Television program, A&E Network, 03 November.

Ingraham, C. 2017. 'The U.S. economy is creating millionaires at an astonishing pace. But what's it doing for everyone else?', *The Washington Post*, 7 December, viewed 15 February 2020, <https://www.washingtonpost.com/news/wonk/wp/2017/12/07/the-u-s-economy-is-creating-millionaires-at-an-astonishing-pace-but-whats-it-doing-for-everyone-else/>.

—— 2018. 'How rising inequality hurts everyone, even the rich', *The Washington Post*, 6 February, viewed 15 February 2020, <https://www.washingtonpost.com/news/wonk/wp/2018/02/06/how-rising-inequality-hurts-everyone-even-the-rich/>.

‘It’s expensive to be poor’ 2015. *The Economist,* 3 September (2015). viewed 14 December 2019, <https://www.economist.com/united-states/2015/09/03/its-expensive-to-be-poor>.

Kagan, J. 2019. *Defined-Benefit Plan,* viewed 03 November 2019, <https://www.investopedia.com/terms/d/definedbenefitpensionplan.asp>.

Kangas, O. & Kalliomaa-Puha, L. 2017. *Austerity measures in Finland,* Brussels: European Commission.

Kenton, W. 2019. *The New Deal,* viewed 29 November 2019, <https://www.investopedia.com/terms/n/new-deal.asp>.

Kenton, W. & Abbott, B. 2019. *Moral Hazard,* viewed 29 November 2019, <https://www.investopedia.com/terms/m/moralhazard.asp>.

Kiyosaki, R. T. 2017. *Rich Dad Poor Dad: What the Rich Teach Their Kids About Money That the Poor and Middle Class Do Not!,* Plata Publishing LLC, Scottsdale.

Klapper, L., Lusardi, A. & Oudheusden, P. 2015. ‘Financial Literacy Around the World: Insights from the Standard & Poor’s Ratings Services Global Financial Literacy Survey’, S&P Global FinLit Survey, viewed 05 November 2019, <https://responsiblefinanceforum.org/publications/financial-literacy-around-the-world-insights-from-the-standard-poors-ratings-services-global-financial-literacy-survey/>.

Kobliner, B. 1996. *Get a Financial Life: Personal Finance in Your Twenties and Thirties,* Simon & Schuster, 2017, New York.

—— 2018. *Money habits are set by age 7. Teach your kids the value of a dollar now,* viewed 03 November 2019, <https://www.pbs.org/newshour/economy/making-sense/money-habits-are-set-by-age-7-teach-your-kids-the-value-of-a-dollar-now>.

Kruger, P. 2007. ‘Just Say AAA’, *The New York Times,* 02 July, viewed 21 January 2020, <https://www.nytimes.com/2007/07/02/opinion/02krugman.html>.

Lambert, R. 2008. Crashes, Bangs and & Wallops. *Financial Times*, 18 July, viewed 02 November 2019, <https://www.ft.com/content/3cc7b1b2-52f2-11dd-9ba7-000077b07658>.

Lee, K., To, B. H. & Yu, K. M. 2013. *The New Paradox of Thrift: Financialization, Retirement Protection and Income Polarization in Hong Kong*, Hong Kong Institute of Education, Working Paper No 10.4000, viewed 23 January 2020, <https://www.researchgate.net/publication/257125754_The_New_Paradox_of_Thrift_Financialization_Retirement_Protection_and_Income_Polarization_in_Hong_Kong>.

Lusardi, A. 2012. *Numeracy, financial literacy, and financial decision-making,* Massachusetts: National Bureau of Economic Research (NBER) Working Paper 17821.

Lusardi, A., Michaud, P. C., & Mitchell, O. S. 2013. *Optimal Financial Knowledge and Wealth Inequality,* Massachusetts: National Bureau of Economic Research (NBER) Working Paper 18669.

Lusardi, A. & Mitchell, O. S. 2011. *Financial Literacy Around the World: An Overview.* Massachusetts: National Bureau of Economic Research (NBER) Working Paper 17107.

Luxton, E. 2017. The World Economic Forum, *Which Countries have the best literacy and numeracy rates?,* viewed 06 March 2020, <https://www.weforum.org/agenda/2016/02/which-countries-have-the-best-literacy-and-numeracy-rates/>.

Lynch, J. 2019. *Children's Allowance Pay is Up - Amount Saved Alarmingly Low: AICPA Survey,* Viewed 08 December 2019, <https://www.aicpa.org/press/pressreleases/2019/childrens-allowance-pay-is-up-amount-saved-alarmingly-low.html>.

Malcolm, H. 2014. *Financial literacy education has lasting impact,* Viewed 22 February 2020, <https://eu.usatoday.com/story/money/personalfinance/2014/04/08/financial-literacy-college-students/7296185/>.

Mui, Y. Q. 2016. 'The shocking number of Americans who can't cover a $400 expense', *The Washington Post,* 25 May*,* viewed 09 February 2020, <https://www.washingtonpost.com/news/wonk/wp/2016/05/25/the-shocking-number-of-americans-who-cant-cover-a-400-expense/>.

Mundy, S. 2008. *Financial Education Programmes in School: Report on Selected Current Programmes and Literature and Draft Recommendations for Best Practices*. OECD Journal: General papers, volume 2008/3. OECD 2008, viewed 21 January 2020, <www.oecd.org/finance/financial-education/40607972.pdf>.

Novak, G., Gavrin, A., Christian, W. & Patterson, E. 1999. *Just-In-Time Teaching: Blending Active Learning with Web Technology*, Benjamin-Cummings, San Francisco.

OECD 2011. INFE (International Network on Financial Education), Measuring Financial Literacy: Core Questionnaire in *Measuring Financial Literacy: Questionnaire and Guidance Notes for conducting an Internationally Comparable Survey of Financial literacy*. Paris: OECD.

—— 2015. *PISA,* Paris: OECD.

—— 2017. *PISA,* Paris: OECD.

—— 2017. G20/OECD INFE report on adult financial literacy in G20 countries.

—— 2018. *PISA,* Paris: OECD.

Ogden, T. 2019. 'More states are forcing students to study personal finance. It's a waste of time', *The Washington Post*, 23 April, viewed 13 November 2019, <https://www.washingtonpost.com/outlook/2019/04/23/more-states-are-forcing-students-study-personal-finance-its-waste-time/>.

Palley, T. I. 2007. Financialization: What it is and why it matters. Washington (DC): Gordon Hall.

Patnaik, P. 2011. *The Meaning of Financial Liberalisation*, viewed 02 February 2020, <https://mronline.org/2011/06/04/the-meaning-of-financial-liberalisation/>.

Pearl, J. A. & Morris, R. A. 2010. *Kids, Wealth, and Consequences: Ensuring a Responsible Financial Future for the Next Generation*, John Wiley & Sons: New York.

Rappeport, A. 2019. Social Security and Medicare Funds Face Insolvency, *The New York Times*, 22 April, viewed 03 November 2019, <https://www.nytimes.com/2019/04/22/us/politics/social-security-medicare-insolvency.html>.

Reinhart, C. M. & Rogoff, K. S. 2009. *This Time Is Different: Eight Centuries of Financial Folly*, Princeton University Press, Princeton, New Jersey.

Reuters Editorial 2018. *South Korea Central Bank warns of fast household debt growth, financial risks,* viewed 03 November 2019, <https://www.reuters.com/article/southkorea-economy-cenbank/skorea-cbank-warns-of-fast-household-debt-growth-financial-risks-idUSL3N1W619I>.

Skagerlund, K., Lind, T., Strömbäck, C., Tinghög, G. & Västfjäll, D. 2018. 'Financial literacy and the role of numeracy – How individuals' attitude and affinity with numbers influence financial literacy', *Journal of Behavioral and Experimental Economics,* vol. 74, pp. 18-25, DOI: 10.1016/j.socec.2018.03.004

Thompson, D. 2012. 'Very Sad Graph: How Much Americans Have Left to Spend After Essentials, Today', *The Atlantic,* 1 August, viewed 08 February 2020, <https://www.theatlantic.com/business/archive/2012/08/very-sad-graph-how-much-americans-have-left-to-spend-after-essentials-today/260606/>.

UNESCO 2017. UIS – UNESCO Institute for Statistics, *More Than One-Half of Children and Adolescents Are Not Learning Worldwide,* Fact Sheet No. 46.

United Kingdom. The Money Advice Service, Department of Money and Pension Service 2017. *Numeracy and Financial Capability – Exploring the links,* viewed 12 December 2019, <https://www.moneyadviceservice.org.uk/en/corporate/money-advice-service-research-establishes-link-between-numeracy-and-managing-money>.

United States. Department of the Treasury, Financial Literacy and Education Commission (2006). *Taking Ownership of the Future.* Viewed 03 November 2019, <https://www.treasury.gov/about/organizational-structure/offices/Domestic-Finance/Documents/Strategyeng.pdf>.

Valckx, N. 2017. *Rising Household Debt: What It Means for Growth and Stability,* Washington: IMF, viewed 16 December 2019, <https://blogs.imf.org/2017/10/03/rising-household-debt-what-it-means-for-growth-and-stability/>.

Vignas, P. 2019. 'Brace for the Digital-Money Wars', *The Wall Street Journal*, 07 December, viewed 09 December 2019, <https://www.marketscreener.com/news/Brace-for-the-Digital-Money-Wars--29694374/>.

Vugt, M. V. 2017. *How Our Kids Learn Naturally - Educational lessons from the world of yesterday,* viewed 04 November 2019, <https://www.psychologytoday.com/us/blog/naturally-selected/201707/how-our-kids-learn-naturally>.

Webb, M. S. 2014. Financial savvy is not something schools can teach. *Financial Times,* 18 September, viewed 19 November 2019, <https://www.ft.com/content/6223ea9e-328d-11e4-93c6-00144feabdc0>.

Wolff, E. N. 2017. *Household Wealth Trends in the United States, 1962 to 2016: Has Middle Class Wealth Recovered?,* National Bureau of Economic Research (NBER) Working Paper No. 24085, viewed 15 February 2020, <https://www.nber.org/papers/w24085>

Financial literacy five proficiency levels of PISA

Table 2. Summary description of the financial literacy five proficiency levels

Level	Score range	Percentage of students able to perform tasks at each level (OECD average-10 – PISA 2015)	What student can typically do
1	326 to less than 400 points	21.1%	Students can identify common financial products and terms and interpret information relating to basic financial concepts. They can recognise the difference between needs and wants and can make simple decisions on everyday spending. They can recognise the purpose of everyday financial documents such as an invoice and apply single and basic numerical operations (addition, subtraction or multiplication) in financial contexts that they are likely to have experienced personally.
2 Baseline	400 to less than 475 points	22.6%	Students begin to apply their knowledge of common financial products and commonly used financial terms and concepts. They can use given information to make financial decisions in contexts that are immediately relevant to them. They can recognise the value of a simple budget and can interpret prominent features of everyday financial documents. They can apply single basic numerical operations, including division, to answer financial questions. They show an understanding of the relationships between different financial elements, such as the amount of use and the costs incurred.
3	475 to less than 550 points	26.0%	Students can apply their understanding of commonly used financial concepts, terms and products to situations that are relevant to them. They begin to consider the consequences of financial decisions and they can make simple financial plans in familiar contexts. They can make straightforward interpretations of a range of financial documents and can apply a range of basic numerical operations, including calculating percentages. They can choose the numerical operations needed to solve routine problems in relatively common financial literacy contexts, such as budget calculations.
4	550 to less than 625 points	19.6%	Students can apply their understanding of less common financial concepts and terms to contexts that will be relevant to them as they move towards adulthood, such as bank account management and compound interest in saving products. They can interpret and evaluate a range of detailed financial documents, such as bank statements, and explain the functions of less commonly used financial products. They can make financial decisions taking into account longer-term consequences, such as understanding the overall cost implication of paying back a loan over a longer period, and they can solve routine problems in less common financial contexts.
5	Equal to or higher than 625 points	10.7%	Students can apply their understanding of a wide range of financial terms and concepts to contexts that may only become relevant to their lives in the long term. They can analyse complex financial products and can take into account features of financial documents that are significant but unstated or not immediately evident, such as transaction costs. They can work with a high level of accuracy and solve non-routine financial problems, and they can describe the potential outcomes of financial decisions, showing an understanding of the wider financial landscape, such as income tax.

Source: (OECD, 2017[14]).

Dataset

The data from the 2012 and 2015 financial literacy assessment are available at http://www.oecd.org/pisa/data/. The databases include, for the sampled students, their cognitive results in financial literacy and in standard PISA domains (mathematics and reading in PISA 2012; mathematics, reading and science in PISA 2015), the behaviour data from the short questionnaire on financial literacy, and data from the general student questionnaire and school questionnaire (only in 2012).