

A MODEL FOR FINANCIAL LITERACY EDUCATION IN LEBANON

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Abstract

Financial literacy has become one of the most discussed topics in the field of behavioral finance as it has strong influences on people's financial behaviors. Yet, the years long data shows that its rates are globally low. What's even worse, is the fact that financial literacy education isn't widespread all around the world specifically at schools. Lebanon is such a country in which financial education as a topic isn't included in the official curriculum. In this research, I provide trainings to a set of schools with the majority of students coming from minority segments. The research is conducted in Lebanon's central area, the Greater Beirut. I find that the students understanding of financial concepts is low and that cognitive abilities play a major role along with financial knowledge in shaping a good financial literacy.

Keywords: *financial literacy, financial knowledge, cognitive abilities, high school students*

1. INTRODUCTION

The academic research body is filled with examples documenting the positive influence financial literacy has on people's financial behaviors (Brown, Henchoz, & Spycher, 2018). From a better retirement planning (Lusardi & Mitchell, 2007), to an increased participation in the financial markets (van Rooij, Lusardi, & Alessie, 2011), financial literacy has become a vital skill everybody needs to acquire in our current days aiming on improving people's financial welfare (Lusardi, 2019). Therefore, it has been integrated into national and international educational policies (Lusardi & Mitchell, 2007; Remund, 2010; Walstad, Rebeck, & MacDonald, 2010; van Rooij, Lusardi, & Alessie, 2011; Willis, 2011; Knoll & Houts, 2012; Skagerlund, Lind, Stromback, Tinghog, & Vastfjall, 2018; Brown, Henchoz, & Spycher, 2018). Though, such efforts came short (Lusardi, 2019; OECD, 2019). Years after this integration, the global financial literacy rates remained low (Klapper, Lusardi, & van Oudheusden, 2015). According to Standard and Poor's 2014 report, only 35% of the people all around the world could be identified as financially literate (Klapper, Lusardi, & van Oudheusden, 2015). In addition, contradicting research results came into the lights (Willis, 2011), which later rooted the need for exploring and checking the issue from diverse perspectives.

As a start, researchers have opened their minds into checking other influencing factors than financial knowledge. A major driving force of this insurgency was Willis (2011)'s results which refuted the idea of ameliorating one's financial literacy through the provision of financial knowledge. She argued that based on her research, some of the people who received financial education took wrong financial decisions, whereas some others who haven't received any sort of financial education did quite good in managing their finances. So why did this discrepancy happen? Some researchers explained this difference by introducing people's cognitive abilities into the discussion (Skagerlund, Lind, Stromback, Tinghog, & Vastfjall, 2018; Demetriou, Kazi, Makris, & Spanoudis, 2020). Specifically talking about quantitative reasoning, researchers such as Demetriou, et al. (2020) and Skagerlund, et al. (2018) got promising results. Demetriou, et al. (2020) based their claim on the longstanding behavioral concept of higher numeracy boosting people's analytical skills therefore sharpening their decision-making process. Similarly, Skagerlund, et al. (2018) have used people's numerical and mathematical skills to explain the differences in financial literacy. Though, what they've added to the academic literature is the introduction of a moderating factor, math anxiety, to the discussion. They've noticed that regardless to people's cognitive abilities, their fear or confidence in using numbers to make informed decisions plays an important role in amplifying their response. Comparably, OECD (2019)'s prepared on-topic framework has included confidence in its generalized form. They've recognized the importance of

adding such a factor as a person's actions are always under the threat of failure fear (Bandura, 1983). So, like in any other decision-making process, it's also important to take into consideration psychological factors in financial decisions (OECD, 2019).

Apart from checking other factors to explain financial literacy, researchers have also recently delved into understanding the financial literacy of the youth. For quite many years, the latter has been overshadowed by the research works done on adults (Walstad, Rebeck, & MacDonald, 2010). What changed the flow of these research works are the claims common to the one pressed by Skagerlund, et al. (2018) emphasizing the principle of financial literacy being a lifelong process. Hence, the need of training the masses from their young ages (Brown, Henchoz, & Spycher, 2018). Though, even without the latter claim, the financial decisions the younger generations will make in the future will surely have the longest effects on the global economy as they'll overlive the current adult population (Lusardi, 2019). That's why, we need to work extensively on shaping a tradition of healthy financial behaviors for them.

In this research, I work on proposing a model for Lebanese high school students' financial literacy. I choose two variable, financial knowledge and quantitative reasoning, as my key variables with giving financial knowledge a mediating role. That's because people without any financial knowledge could manage their finances in a good way. Whereas people with good numerical skills and good knowledge of financial principles could do even better. I also add two moderating factors, math anxiety and confidence, to check if the relationships between the other variables are calibrated by psychological and emotional factors.

The coming parts of this research are as follows. I start with posing my hypotheses and present my proposed model after which I explain my choice of instruments to each of the variables. Then, I discuss about the survey preparation, sampling, and data cleaning processes followed by an illustration of the research results and discussion. I conclude this work with summarizing the available literature and the results of this research. I also discuss the limitations of this research and provide propositions for similar future research works.

2. MATERIALS AND METHODS

2.1. Hypothesis Posing & Research Model

There's a concession about financial knowledge on being at the top of the list of factors influencing financial literacy. The latter being the understanding of financial concepts, financial literacy is explained by the use of this knowledge to make informed financial decisions with full confidence (Lusardi & Mitchell, Financial Literacy and Retirement Preparedness: Evidence and Implications for Financial Education, 2007; Huston, 2010). Just like any other sort of knowledge, different principles exist from which some might be more important to people from a time to another based on the circumstances (Huston, 2010; Knoll & Houts, 2012). Hence,

Hypothesis 1: The better a student's understanding of financial principles, the higher is the financial literacy score

Following the financial knowledge in the list of the factors influencing financial literacy, quantitative reasoning in its different forms (mathematical skills, numeracy, numerical skills ...) comes next. Recently, there has been quite a long discussion about it (Cole, Paulson, & Shastry, 2014; Skagerlund, Lind, Stromback, Tinghog, & Vastfjall, 2018; Demetriou, Kazi, Makris, & Spanoudis, 2020). There has been an agreement that this skill might surpass financial knowledge in importance as it directly influences people's decision making process especially through amplifying their analytical thinking and problem-solving skills (Demetriou, Kazi, Makris, & Spanoudis, 2020). Hence,

Hypothesis 2: The better a student is in quantitative reasoning, the higher is the financial literacy score

Some researchers also add non-cognitive factors, such as psychological and emotional ones into the discussion. An example is Skagerlund, et al. (2018) and OECD (2019) which take a close look towards

math anxiety and confidence. Though, these aren't regarded as simple variables and rather given a moderating roles.

Similarly, financial knowledge will be regarded as a mediating factor between quantitative reasoning and financial literacy. Hence my research model,

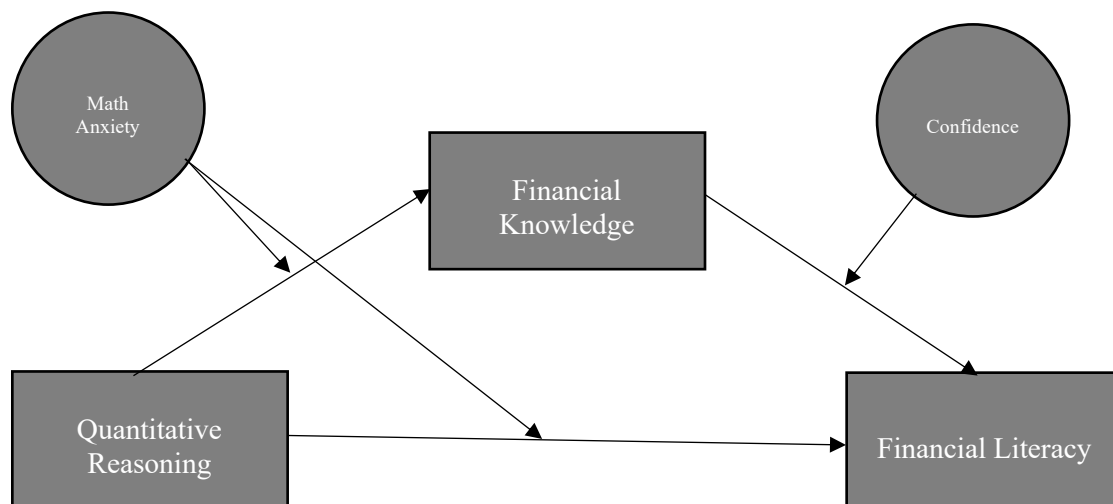


Fig. 1. Research Model

In which, Y=financial literacy, X=quantitative reasoning, M=financial knowledge, W=math anxiety, V=confidence. Checking the different models of the Process macro by Professor Andrew Hayes, I can relate my model to number 22 in the list. Hence, I run the necessary tests after cleaning the data in the coming parts.

2.2. Instruments

In this research, I have used several instruments to check my hypothesis. Starting with the dependent variable of this research, financial literacy, I have used 7 of OECD's PISA financial literacy measurement which was developed in 2012 (OECD, 2019). Though, one question is divided into two parts which I'll be counting separately. As my research is focused on high school students, I found this measurement to be the most fitting to my needs. I have disregarded some of the questions as they weren't corresponding to my research's financial knowledge part for which I have used 13 different questions. Three are corresponding to the "Big Three Questions" provided by Lusardi and Mitchell for financial literacy (Lusardi & Mitchell, 2007; van Rooij, Lusardi, & Alessie, 2011; Skagerlund, Lind, Stromback, Tinghog, & Vastfjall, 2018). Contrary to what it's meant to capture, I have used it as part of my financial knowledge because they basically check a person's knowledge of three key principles, interest compounding, inflation, and risk diversification. I have also added some similar questions to Swicka, et al. (2020) who have produced a financial knowledge index composed of 12 true/false statements. The cronbach's alphas is 0.75 (Swiecka, Yesildag, Ozen, & Grima, 2020). In addition, I added some questions of my own believing they'll be interesting to be added in novel research works such as a question on cryptocurrencies and financial rules of thumbs (rule of 72). As for the quantitative reasoning, I have used two instruments, the Berlin Numeracy Test, as it incorporate statistical numeracy and risk literacy, two concepts quite related to financial decisions (Cokely, Galesic, Schulz, Ghazal, & Garcia-Retamero, 2012). However, as its Cronbach alpha is usually low, I have also used the Cognitive Reflection Construct by Frederick (2005) which checks time preferences and risk preferences. I will be using both of these tests together and form a new construct called, quantitative reasoning. For math anxiety, I have used the abbreviated math anxiety scale (Carey, Hill, Devine, & Szucs, 2017) which has

been used by similar previous research, Skagerlund, et al. (2018). Whereas for confidence, I'll be using the Hogan Personality Inventory test's lower-level subscale on overconfidence which is formed of 6 questions.

2.3. Methods

For a period of one month, February 1, 2022 to March 1, 2022, a set of 40 minutes financial literacy trainings have been conducted to high school students in nine Lebanese schools of the ethnically Armenian community. All the schools were chosen to be located in the Greater Beirut area to avoid any geographical discrepancy. Two different topics were tackled, "Sources of Funds" and "Investments" and chosen randomly from a training to another. Following the sessions, the students were asked to fill a survey which took them 25 minutes on average. Some students were asked to fill the surveys before the training in order to be able to make a pre-post analysis. In total, 302 students filled the questionnaire. I have used IBM SPSS (version 23) to run the necessary tests especially because Process Macro for Mediation and Moderation is compatible with it.

2.4. Data Preparation

Once the questionnaires were filled and submitted back to me, I have entered the data manually to the software. Before running the necessary tests to answer my research questions, I have cleaned my data. After removing the incomplete questionnaires, I'm left with 289 valid cases after which I ran the Mahalanobis test to check the outliers. Only one outlier existed (case 83) which I removed from my dataset. I also checked my data's homoscedasticity and the absence of multicollinearity.

I have also checked the Cronbach Alpha's of my used instruments and set 0.6 as an acceptable score. The table below shows the different alphas and number of items of each instrument. All of them have scores above the designated score (0.6) which means they're valid to be used as one construct.

Instrument	Cronbach's Alpha	No. of Items
Financial Literacy	0.879	8
Financial Knowledge	0.615	13
Quantitative Reasoning	0.667	7
Math Anxiety	0.882	9
Confidence	0.610	6

Table 1. Instruments Validation

3. RESULTS

The research results show that out of the valid 288 cases, 154 students were females and 134 students were male. Nearly 67% of them had no work experiences before nor had they any fixed income in the form of allowance. Though 61.8% reported a usual discussion about financials with their parents which is a relatively high percentage for a developing country like Lebanon noting that only one-third of at least one of the parents of the students had a higher education. In addition, 30.6% of the students reported of never having had a course in economics, business, or commerce which could be interesting to check the difference between them and the ones who have. Moreover, only 22.7% of the students reported of having failed math at school, a rate which could be different than the usual.

I started testing the results of my results with running four simple linear regressions between each of my independent variables, financial knowledge – quantitative reasoning – math anxiety – and confidence, with the research's dependent variable, financial literacy.

Independent Variable	Coefficient	P-Value
Financial Knowledge	0.329	0.000
Quantitative Reasoning	0.545	0.000
Math Anxiety	-0.211	0.165
Confidence	0.208	0.279

Table 2. Simple Linear Regressions

The result of the first regression conforms my first hypothesis that the more knowledge a person has in financial matters, the higher will his/her financial literacy be. Similarly, the result of the second regression conforms with my second hypothesis that the more quantitative reasoning capability a person has, the higher will his/her financial literacy be. However, the third and fourth regressions show that math anxiety and confidence do not correlate with financial literacy at 95% confidence interval.

Using the Process Macro, I have also run Model 22 in order to check the validity of my proposed framework. The results show that the model is statistically significant ($p\text{-value}=0.000$) and that 25.60% of financial literacy's variation is explained by the researched variables. The results also show that financial knowledge can have a mediation role between people's quantitative reasoning capability and their financial literacy. Though, neither of the two moderators, anxiety and confidence, nor their interactions with the respective independent variables are significant. By exploring the results further, it appears that as anxiety increases, the conditional direct effect of quantitative reasoning on financial literacy decreases. The indirect effect show that the effect of quantitative reasoning increases when math anxiety increases and decreases when confidence increases. Though, the two moderations being insignificant, I cannot overstate the latter results.

To check the mediating role of financial knowledge, I ran Model 4 which is a simple mediation model. The results are significant similar to the previous findings, yet the coefficient of determination decreased to 24.74%. The coefficients are 0.2477 and 0.4526 respectively to financial knowledge and quantitative reasoning, and the constant is 0.7699. The indirect effect of the latter on financial literacy has a coefficient of 0.0920 with being statistically significant.

I also ran some tests to check the results of my research other than checking the hypothesis. Based on the gender differences, males have a better quantitative reasoning, more financial knowledge, less math anxiety, and more confidence. Yet, there's no difference in the financial literacy between males and females which is staggering noting the differences in the remaining factors.

	Males	Females	P-Value (ANOVA)	Difference Exists?
Financial Literacy	3.2537	2.8766	0.145	No
Financial Knowledge	6.7985	5.6688	0.000	Yes
Quantitative Reasoning	1.8657	1.4675	0.046	Yes
Math Anxiety	2.3503	2.8506	0.000	Yes
Confidence	3.4789	3.2652	0.007	Yes

Table 3. ANOVA Between the Variables and Gender

I continued on checking the existence of any difference between the students financial knowledge with five other factors: the topic of the training, the class of the students, if they had any previous work experience, financial socialization, and parents educational attainment. I failed to find any statistically

significant result to claim a difference in the knowledge of students on financial principles based on the content of the training they've been through (p -value (anova)=0.399). Similarly, I found no statistically difference between students of different classes and educational focuses, nor did I find any difference between the ones who had previously worked in a paid job and the ones who haven't. As for financial socialization and parent's educational levels, the students who reported having discussed financial matters with their parents and the ones who reported having at least one of their parents holding a university degree, have higher financial knowledge than their counterparts by a full 1 point score.

Conversely, the same three first factors are statistically different between the different groups when it comes to financial literacy and the last two are statistically insignificant. The ones who are the most financially literate are the ones who took "Investments", followed by the ones who didn't take any training (2.7) and "Sources of Funds" (2.6324). Students' financial literacy scores increased with an upper grade class especially if part of the academic sections. The highest among them are the 12th graders of General Science students followed by Economics and Sociology students and Life Science students. The ones who scored the least are the 10th graders of the technical section who scored nearly 0.9 points lower than their academic counterparts. There's also a difference between the ones who have work experience (scored 3.4409) compared to the one who have never worked before (scored 2.8601) on average. There's no statistical difference of financial literacy scores between the people who have good financial socialization with parents and the ones who don't. The same applies to the parental educational attainment.

Moreover, running an ANOVA between the students financial knowledge among those who have filled the survey before the raining and those who have filled it after, shows no-statistically significant results (p -value= 0.680).

4. DISCUSSION

Prior discussing the main research findings, it's worth discussing shortly the total research plan. To start with, my addition of novel instruments to capture people's financial behavior has been relatively successful. I've added questions on cryptocurrency's identification and another on financial rule of thumb. Both of these notions are arguably much discussed, either positively or negatively, though I found them quite necessary to be included. All around the social media and all over the news, people are filled with discussions of cryptocurrencies. As part of the novel products in the financial markets, people must be able to recognize them. In addition, the traditional behavioral theory states that much of people's acts focus on rules of thumbs. So why shouldn't they use the right ones if they're already doing that?

Similar to many other research works dealing with financial literacy, this research work delves also into understanding the socio-demographic differences of the selected sample. First of all, talking about the gender, I fail to find any statistical difference between the financial literacy rates of high school students in Lebanon. Unlike many other prominent works such as Cole, et al. (2014) Brown, et al. (2018) which discuss the financial literacy of high schoolers, and Lusardi and Mitchell (2007) which discusses financial literacy in general, my sample's distribution of financial literacy is genderless. Though, I do find a strong difference between males and females financial knowledge levels. This difference might be due to the fact of using financial literacy, financial education, financial knowledge, and financial capability interchangeably in different research works. In this research for instance, what had been used to calculate people's financial literacy has been used to calculate financial knowledge. Though, similar to previous research works, the financial literacy of students is low with a score of 3.05 out of 8 (standard deviation 2.18). The result is similarly low when it comes to financial knowledge with an average score of 6.19 (standard deviation 2.44), which is quite threatening. Strong and firm decisions are therefore needed to improve the situation and save the students' future financial stability.

The research proposes a model in which financial literacy is mediated by financial knowledge instead of having the latter as an independent variable with its main variable being quantitative reasoning. Such works have previously been done by Skagerlund, et al. (2018) and others, though the existing research works focused on the adult population and didn't clearly mention the mediating role of financial

knowledge. Moreover, based on the results of this research, I can't be of total agreement to the previous research works as they succeeded in finding enough supporting evidence for moderating roles to emotional factors (math anxiety and confidence) to which I failed to do the same.

5. CONCLUSIONS

Financial literacy has come to prominence in the last couple of decades due to the increased complexities in the financial markets and the need of people in managing their own financials on their own (Skagerlund, Lind, Stromback, Tinghog, & Vastfjall, 2018; OECD, 2019). According to Lusardi (2019), financial literacy through the implementation of financial education is a key changer to a better personal and national welfare. That's because it boosts people's financial positions on the short and long terms, along with decreasing the threats of them committing wrong financial behaviors which if accumulated lead to financial distresses (Cole, Paulson, & Shastry, 2014; OECD, 2019). According to modern literature, understanding how financial literacy is gained by the younger generations and making sure that they receive at least a reasonable amount of financial education is important for the global economy's future (Brown, Henchoz, & Spycher, 2018) (Lusardi, 2019). Hence why this research not only focuses on high school students, but on students coming from a minority community at a developing nation, Lebanon. I found that financial knowledge mediates the relationship between quantitative reasoning and financial literacy. Similarly to Cole, et al. (2014), Skagerlund, et al. (2018), and Demetriou, et al. (2020), my results confirm the importance of the mentioned two variables though fail in finding any moderating roles to math anxiety and confidence. In addition, this research shows that there's no difference between the content of the trainings in financial education when discussing the accumulation of financial knowledge through it. Nonetheless, financial literacy is correlated to the latter.

Regardless to the good results this research has, it has still room for improvement. As this research focuses on Lebanese schools of Armenian heritage, the research results might be specific to this segment of the Lebanese community. That's why, it could be interesting to check a wider scope of Lebanese high school students especially if schools are selected from all around the country. Lebanon is composed of seven governorates, each with a specific geographical, social, and economic characteristics. It could also be worth checking the differences in financial literacy of students coming from different main foreign language, English or French, as to what Brown, Henchoz, and Spycher (2018) recommend. The latter found a reasonable amount of difference between the different cultures in Switzerland, so the same could be true for Lebanon. In addition, this research is a personal work of just one individual which raises many constraints. First, the time constraint as each visit to a school took around one hour and half noting that on average each 20 students had a private session. In only couple of times did I give a training to up to 30 students at once by merging smaller classes together. Another constraint is the financial constraint which could play a big role in such research works. With a financial support, it could be possible to run financial literacy bootcamps with academic and professional support for selected students. It would also make possible to have financial incentives in accepting to run such trainings periodically permitting the researcher to check if any difference could exist due to the amount of time invested for financial literacy education. Moreover, this research doesn't take into consideration the income levels of students which could play an important role in their financial socialization. Furthermore, Lebanon's current economic state is unstable and discussing about banks and how to deal in the financial markets could be unrealistic. That's why, at the beginning of each session, I made sure to notify the students about this and asked them to disregard the abnormal big amount of problems the country is going through.

To conclude this paper, it's safe to say that in order to increase the financial literacy of high school students in Lebanon, the focus should be twofold, improving their quantitative reasoning and making them more knowledgeable of financial principles. Mandates should be issued to spread financial education in the high school curricula focusing on personal finance topics. It's also important to note that schools should encourage partial employment opportunities to their high schoolers especially during long vacations such as summertime to improve their financial standings.

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