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## ANALYSIS OF FINANCIAL LITERACY AMONG HIGH SCHOOL STUDENTS, GRADUATES, AND YOUNG PROFESSIONALS IN GERMANY

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**Abstract.** This research paper aims to examine various factors influencing the financial literacy of high school students, graduates, and young professionals. Although the academic literature has dealt extensively with the factors influencing financial literacy, no current study focuses on Germany and explicitly on the group of young people with an upper educational level. The empirical research undertaken primarily examines the influence of different manifestations of academic status, income, gender, and origin on the degree of financial literacy. In this context, financial literacy is approximated using the scientifically established set of questions, the so-called “Big Three” questions. A total of over 500 participants were surveyed. To evaluate the results, a simple linear regression model is formulated for each hypothesis and then tested for significance using the T-test. Subsequently, a multivariate regression model based on the significant influencing factors is specified and tested again. Thereby, the examined factor of gender is highly significant. Immigration background also influences financial literacy. Findings related to education, background, and income were often inconclusive or weak. No influence of the place of residence, the parent’s educational level, or a practice-related education on financial literacy could be found.

**Keywords:** financial education; financial literacy; gender gap; high school students; graduates; young professionals

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**JEL Classifications:** A23, C12, G53

### 1. Introduction

The topic area of financial literacy has come under political discussion in recent years. This is due both to the consequences of the economic and financial crisis of 2008 and to the fact that many countries are restricting their social systems and increasingly transferring responsibility to citizens. As a result, more and more people are having to manage their financial situation. However, according to the current state of research, the level of financial literacy in the population is to be classified as “too low” (Bachmann et al., 2021). Recent and past studies show that there are major fundamental deficits in knowledge about financial literacy (OECD, 2020).

Germany compared to other countries, performed relatively well but there is a wide range within the different socio-demographic groups (Bucher-Koenen & Lusardi, 2011; Schmidt & Tzamourani, 2017; Stolper & Walter, 2017).

## **2. Theoretical Background**

Financial literacy is a subfield of economic literacy and, in this context, the part of economic literacy that deals with the mechanisms of the economy. In particular, individuals with a high level of education have often attended (e.g., as part of their studies) specific courses dealing with financial products or the functioning of the market economy (Reifner, 2003). In this context, it should be emphasized that even frequently cited technical papers, such as those by Lusardi and Mitchell (2007) have not prefaced a definition of financial literacy. Kaminski and Eggert (2008) derive several practice areas from their definition of financial literacy that aims to provide people with the financial skills they should have to enable them to engage in appropriate financial decision-making behaviors. The central fields of action in financial literacy are financial resources, life risks, asset accumulation, and loans. In the scope of dealing with financial risks, individuals must consider their current financial situation as well as their income and expenditure accordingly. Furthermore, the question should be asked as to what costs and time are involved in financial transactions and what means of payment should be used (Kaminski & Eggert, 2008).

Huston (2010) analyzed around 70 studies in the field of financial literacy. In more than two-thirds of these studies, the definition was completely missing, and in the remaining studies, the definitional approaches vary so much that no unified definition can be determined. Numerous approaches to defining financial literacy exist in the literature. A study by Kaiser and Lutter (2015) shows that in empirical research, the number of citations in the field of financial education is subject to a steady increase, but still, the concept behind it is insufficiently explained.

Based on the OECD/INFE definition of financial literacy, which focuses specifically on financial decision-making, and the clarification provided by the corresponding OECD and INFE questionnaire, this definition of financial literacy is directed at adults who have the total legal capacity and have thus reached the age of 18 years (Seeber & Retzmann, 2017). Like most academic studies in Germany, this study follows the OECD/INFE definition of financial literacy, according to which financial literacy can be derived from existing financial knowledge and the corresponding behavior in financial decisions (Seeber & Retzmann, 2017).

Questions on financial knowledge primarily focus on interest rate effects and inflation, whereas those on financial behavior focus on managing personal budgets, investment decisions, and borrowing (OECD, 2018). To determine financial literacy, the OECD and INFE also ask questions in the latest 2020 study that relate to both financial behavior and financial knowledge (OECD, 2020).

The most common definition of financial literacy in the current literature, which is also used by the G20 countries, comes from the Organisation for Economic Co-operation and Development (OECD) and the OECD-founded International Network for Financial Education (INFE; Bucher-Koenen & Knebel, 2021). The OECD and INFE define financial education as follow: “A combination of awareness, knowledge, skills, attitude, and behavior necessary to make sound financial decisions and ultimately achieve individual financial wellbeing”.

*Definition of the Target Group: High School Students, Graduates, and Young Professionals*

This research paper examines in particular the financial literacy of high school students, graduates, and young professionals. However, it is often unclear in which situations a young professional is considered. Therefore, a clear conceptual delineation of the target groups is needed:

- (1) High School Students;
- (2) Graduates;
- (3) Young Professionals.

(1) A high school student is a person who has achieved or is short to attain a degree entitling him or her to study in Germany. The general higher education entrance qualification, the subject-related higher education entrance qualification, or the advanced technical college entrance qualification may have been obtained. The general higher education entrance qualification is awarded after completing the upper secondary school at a Gymnasium, a vocational Gymnasium, or a comprehensive school and represents an unrestricted entitlement to study. On the other hand, the subject-related university entrance qualification restricts access to higher education to specific courses of study. The “Fachhochschulreife” is obtained after successful completion of a school-based and a vocational part at a higher school (e.g., “Berufskolleg”, “Fachoberschule”, “Berufsoberschule”).

(2) A Person who has completed a course of study or training, especially a person who has been awarded an undergraduate or first academic degree. The degree usually leads to a bachelor's degree, a diploma, a master's degree, a doctorate, or a passed state examination. In this research work, only students who have not yet reached the age of 30 are considered.

(3) There is no generally accepted definition of a young professional in the literature (Luippold, 2021). Young professionals are usually people who have not yet reached the age of 30 but have already completed their first degree (at least a bachelor's degree) (Luippold, 2021). In most cases, they have also gained their first professional experience.

*Key Factors influencing Financial Literacy and Behaviour*

According to scientific studies, the quality of financial decision-making correlates significantly with the financial literacy of individuals (Grohmann & Menkhoff, 2015). This fact is theoretical since higher financial education in the form of more extensive financial knowledge generally leads to better financial behavior as well as a higher quality of financial decisions. The factors influencing the level of financial literacy are mainly as follows:

(1) Level of education: The level of education is an essential factor influencing financial literacy, but this correlation varies across countries due to different education systems. Evidence shows that a high level of education (for example, among individuals with a university degree) often leads to higher financial literacy than individuals with a very low level of education (Stolper & Walter, 2017; Bottazzi & Lusardi, 2021).

(2) Gender: despite a more modern division of roles due to societal changes implying that greater diversity leads to more economic responsibility for women, women are significantly less financially literate than men (Jappelli & Padula, 2013; Siegfried & Wuttke, 2021; Bottazzi & Lusardi, 2021; Kubak et al., 2021).

(3) Income: Income is a significant determinant of the degree of financial literacy. Higher-income flows increase both the willingness to invest and the willingness to save (for retirement), which is very limited or hardly possible with a low income (Brugiavini, 2002; Hou & Schuler, 2022).

(4) Place of residence: In terms of the level of financial literacy, it is assumed that people who grew up as children and adolescents in small towns have fewer opportunities to acquire financial literacy. This assumption is based on the fact that the availability of financial education is higher in larger cities (Klapper & Panos, 2011; Bottazzi & Lusardi, 2021).

(5) Practice-based training: Practice-based training (even before a degree program) provides additional knowledge that can be supportive in making financial decisions (Riebe, 2018).

(6) Parents' level of education: Children and young people from so-called “working-class families” often have more difficult access to financial education compared with those academics. The reason for this is that parents with a degree can introduce their children to economic contexts at an early age (Lusardi et al., 2010; Kubak et al., 2021).

(7) Origin: National background is seen as a key influencing factor in financial literacy, so an immigrant background is seen as hampering the attainment of high financial literacy (Bucher-Koenen & Lusardi, 2011; Siegfried & Wuttke, 2021).

#### *Financial Literacy among High School Students, Graduates, and Young Professionals*

In an empirical study by FOM University of Applied Sciences, subjective self-assessment and objective financial knowledge were surveyed. More than half of the young professionals surveyed (62%) rated their financial knowledge as high. In addition, 82% have objectively measured “good” financial knowledge, which represents a positive correlation. The study also shows that educated young professionals are capital market-savvy and diversified in investment opportunities in the capital market. In this regard, 57% of respondents beat inflation with their investment, although only under 40% trust an external advisor with their investment strategy (Reiter et al., 2016).

The study “Economic Education in Germany Index (OeBix)” of the Flossbach von Storch Foundation, conducted by the Institute for Economic Education (IÖB) at the University of Oldenburg, describes the current state of knowledge regarding financial and economic education at schools in Germany (Loerwald et al., 2021). These research results are the first to provide a data basis for Germany that substantiates the need to strengthen financial and economic education based on figure 1 and figure 2. The survey was conducted among high school students as well as other students. As a result, eleven out of 16 German states did not even meet 50% of the requirements necessary for the school subject “Economics” (Loerwald et al., 2021). These results are confirmed by a study conducted by Bernstein and Rawe (2021) in which students were asked about their financial literacy self-assessment. In school grades, they rated their financial knowledge at 3.3, a downward trend from 3.1 in the previous three years. Nevertheless, interest in financial education is exceptionally high. For example, 9 out of 10 young people said they would like a subject that taught them about money as well as finance (Bernstein & Rawe, 2021). Furthermore, according to a representative Forsa survey (2021), 59% of schoolchildren between the ages of 14 and 21 believe there is no equality of opportunity in Germany regarding their financial and cultural background (Forsa, 2021).

The target group of students from all disciplines should be considered more closely, as they should have a comprehensive general education based on their previous education and the expansion of their knowledge (through the studies they have embarked on). Also, the scientific literature assumes that a high level of general education correlates positively with financial literacy. However, it should be noted that factors such as cultural or family influences as well as differences in the education system also play a role (OECD, 2020).

### *Measuring Financial Literacy*

The questions on financial literacy often include the so-called “Big Three” question catalog (Lusardi & Mitchell, 2011a). The latter tests financial knowledge on the topics of interest rates, inflation, and diversification. The “Big Three” questions form the basis of much of the research regarding financial literacy, as they have been asked in the same form for more than a decade and thus allow a high degree of comparability. To ensure comparability with other studies, this research is limited to measuring financial literacy using the “Big Three” questions, which is in line with the accepted approach of Lusardi and Mitchell (2011b). Measuring the financial literacy of individuals is often challenging because financial literacy encompasses not only financial knowledge but also financial behavior (Schmidt & Tzamourani, 2017). The OECD/INFE has developed a standardized methodology for measuring financial literacy, which is now used by many countries around the world to test financial literacy. The financial behavior questions include, for example, whether an individual pays his or her bills on time (OECD, 2018). This methodology uses a standardized questionnaire that includes questions on both financial behavior and financial knowledge (OECD, 2020). The answers to the “Big Three” questions are combined to form a score within the scientific research. Correct answers are assigned a value of 1. Incorrect answers and questions in which “I don't know” was stated or no information was given are assigned a value of 0. The score is the sum of the values of the “Big Three” questions. Therefore, the score can assume a maximum value of 3 (all three questions answered correctly) - and a minimum value of 0. To test a hypothesis that assumes that a specific factor (e.g., education level of individuals) influences the degree of financial literacy, a question to determine the influencing factor must be formulated and included in the questionnaire. Subsequently, the expression of the influencing factor measured by the question (e.g., educational level is bachelor's degree) can be compared with the respective score value for measuring financial literacy and, in this form, it can be checked whether the individual factor influences financial literacy. In this context, regression analyses, as well as hypothesis tests, are often used in addition to descriptive statistics. The empirical part of this research uses descriptive statistics and regression analyses with hypothesis tests to describe the data set collected to test the hypotheses formulated.

This research paper and the empirical study conducted are intended to provide insights into the financial literacy of high school students, graduates, and young professionals, a group that has been insufficiently researched in Germany. This is particularly important given the relevance of financial literacy for the prosperity of a society. The coming generations of high school students, graduates, and young professionals contribute significantly to the future wealth generation and wealth preservation in Germany.

### **3. Research objective and methodology**

#### *Hypotheses*

Analogous to the current state of research regarding the individual hypotheses on the factors influencing financial literacy, this paper examined factors influencing financial literacy. To test the influence of these factors on financial literacy, the following hypotheses were tested:

#### *Education level*

**Hypothesis 1 (H1):** Individuals with a higher level of education have higher financial literacy than individuals with a lower level of education. This hypothesis assumes that as the level of education, measured by technical education, increases, so does the degree of financial literacy (Stolper & Walter, 2017; Bottazzi & Lusardi, 2021).

*Gender*

**Hypothesis 2 (H2):** Women have lower financial literacy than men. This hypothesis is based on the assumption that women have lower financial literacy than men (Jappelli & Padula, 2013; Siegfried & Wuttke, 2021; Bottazzi & Lusardi, 2021; Kubak et al., 2021).

*Income*

**Hypothesis 3 (H3):** High income leads to high financial literacy. This hypothesis assumes that high income promotes higher financial literacy. This hypothesis assumes that there is no reciprocal relationship, i.e., income influences the level of financial literacy, but not vice versa (Brugiavini, 2002; Hou & Schuler, 2022).

*Residence*

**Hypothesis 4 (H4):** Individuals living in urban areas will have higher financial literacy than individuals living in smaller towns. This hypothesis assumes that the degree of financial literacy depends on the size of the place of residence (Klapper & Panos, 2011; Bottazzi & Lusardi, 2021).

*Practical training*

**Hypothesis 5 (H5):** Pre-college work-based education leads to higher financial literacy. This hypothesis states that practice-based undergraduate education will increase the level of financial literacy (Riebe, 2018).

*The educational level of parents*

**Hypothesis 6 (H6):** Individuals with at least one academic as a parent will have higher financial literacy than those who do not come from an academic household. This hypothesis refers to the fact that the educational level of the parents influences the later level of financial literacy of the children (Lusardi et al., 2010; Kubak et al., 2021).

*Origin*

**Hypothesis 7 (H7):** Individuals with an immigrant background have lower financial literacy. This hypothesis tests whether the origin in sense of a migration background of the parents has a negative influence on the child's education (Bucher-Koenen & Lusardi, 2011; Siegfried & Wuttke, 2021).

*Data collection*

For data collection, a questionnaire with 27 questions was created. For this study, only a section of the questionnaire was relevant to test the relevant hypotheses. This section of the questionnaire includes the “Big-Three” questions, a question to elicit age, a control question to check for consistency of the questionnaire, and one question for each hypothesis H1 to H7 to be tested. The question on age was relevant because, following the definition of high school students, graduates, and young professionals were only included in this research up to the age of 30. The control question referred to whether a respondent is currently studying, has already completed their studies, or has not studied. If the respondent indicated a master's degree as the highest level of education, the control question could not be answered with “I have not studied”. This question checked the plausibility of the respective data set and excluded questionnaires that were not carefully completed by the respondent. The questionnaire was published via the online portal “empirio - surveys for students” and was available from August 1 to December 31, 2021. A total of 728 respondents participated in the study and completed the questionnaire.

*Data cleansing*

The collected data was cleaned according to the requirements of this research. First, a total of 205 records were removed because respondents indicated an age of over 30 and this study targeted high school and college students, and young professionals who are under 30. Furthermore, questionnaires were excluded in which the essential questions about age, education level, gender, and place of residence, as well as the control question, were not answered. Two data sets in which “diverse” was specified as the gender were also excluded from the



data due to the low number and the associated low statistical relevance. In another six data sets, the control question was not answered consistently regarding the educational qualification indicated. In total, 502 questionnaires were included in the study after the selection of the data sets, with 446 data sets referring only to high school students, graduates, and young professionals. The following table 1 shows a summary of the adjusted data:

**Table 1.** Data cleansing

	Quantity
Records	<b>728</b>
Age “over 30 years” or “not specified”	205
Gender “diverse” or “not specified”	5
Educational level “not specified”	5
Place of residence “not specified”	1
A control question not answered consistently or “not specified”.	10
Relevant data sets for this study	<b>502</b>
of which high school students, graduates, and young professionals	
thereof education (without a high school diploma)	29
thereof secondary school diploma	20
of which skin school diploma	7

*Source:* Own survey

To improve the evaluation and comparability of the data with other studies, additional categories were formed for the questions on educational level, income, and place of residence, and the data collected were classified accordingly. These categories are shown in the following table 2:

**Table 2.** Categorization of educational level, income, and place of residence

	Categories
Education level	very low, low, medium, high
Income	not specified, very low, low, medium, high
Residence	small place, city, big city

*Source:* Own survey

In the final step, the score for the “Big Three” questions was determined for each data set, analogous to the described methodology. The results of the evaluation of the score for the consolidated consideration of the “big three” questions can be taken from table 3 below.

#### *Descriptive statistics*

The descriptive analysis of the data first looked at the response behavior of the respondents concerning the “Big Three” questions. Subsequently, key aspects of the data collected from the target group of high school students, graduates, and young professionals were examined. The results from the evaluation of the “Big-Three” questions are summarized in the following table 3:

**Table 3.** Evaluation of the “Big Three” questions according to response behavior

	Relevant respondents (n <sub>1</sub> = 502)		High school students, students, and young professionals (n <sub>2</sub> = 446)	
	Quantity	%	Quantity	%
<b>A. Question about the interest</b>				
<b>higher than 102 Euro</b>	<b>401</b>	<b>79,9 %</b>	<b>365</b>	<b>81,8 %</b>
exactly 102 euro	29	5,8 %	22	4,9 %
lower than 102 euro	39	7,8 %	32	7,2 %
I do not know	27	5,4 %	23	5,2 %
not specified	6	1,2 %	4	0,9 %
<b>B. Question on inflation</b>				
More	10	2,0 %	8	1,8 %
just as much	17	3,4 %	15	3,4 %
<b>Less</b>	<b>413</b>	<b>82,3 %</b>	<b>370</b>	<b>83,0 %</b>
I do not know	55	11,0 %	48	10,8 %
not specified	7	1,4 %	5	1,1 %
<b>C. Diversification question</b>				
I agree	50	10,0 %	44	9,9 %
<b>I do not agree</b>	<b>326</b>	<b>64,9 %</b>	<b>294</b>	<b>65,9 %</b>
I do not know	109	21,7 %	92	20,6 %
not specified	17	3,4 %	16	3,6 %
<b>D. Overall view</b>				
<b>three questions correct (score 3)</b>	<b>260</b>	<b>51,8 %</b>	<b>237</b>	<b>53,1 %</b>
two questions correct (score 2)	148	29,5 %	133	29,8 %
one question correct (score 1)	64	12,7 %	52	11,7 %
no question correct (score 0)	30	6,0 %	24	5,4%
Mean (M) Score	2,27		2,31	
Standard deviation (SD) Score	0,90		0,88	

Source: Own survey

In table 3 the results of the answers to the “Big Three” questions from all respondents relevant to this study (n<sub>1</sub> = 502) are compared with those from the target group of high school students, graduates, and young professionals (n<sub>2</sub> = 446). Looking at the answers, it can be seen that when considering all respondents relevant to this study, 80% answered the question on interest rates correctly, and 82% answered the question on inflation correctly. On the other hand, only the question of diversification could be answered by only 65% of the respondents. For this question, moreover, the proportion of respondents who indicated “I don't know” as an answer was exceptionally

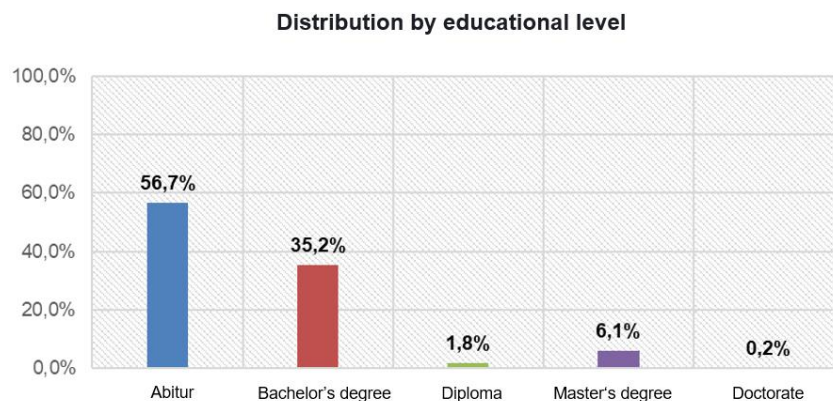


high at 22%, compared with the other two questions. This result is comparable with other studies from Germany, where a lower proportion of respondents answered the question on diversification correctly.

It should be emphasized that the question on inflation was answered much better, with 82% correct answers, both in comparison with other studies for Germany and in an international comparison. One reason for this could be that inflation in Germany rose significantly again in 2021 for the first time in 20 years, and this mainly affects young people under 30, as they are exposed to a corresponding increase in consumer prices. On the one hand, some of these people still have to finance their education; on the other hand, they are often only at the beginning of their careers and first must build up appropriate capital for old age. Therefore, both aspects pose challenges for young individuals due to increased consumer prices.

Overall, the respondents in this study rank first in an international comparison. Of the respondents relevant to this study, 52% are considered “financially savvy”. Only a study by Brown and Graf (2013) for Switzerland was able to achieve a comparable result in an international context. Only 6% of the relevant respondents were unable to answer any question.

A comparison of all relevant respondents with the target group of high school students, graduates, and young professionals shows that the overall results differ slightly. The target group of high school students, graduates, and young professionals is between 1% and 2% higher for each correctly answered question and also for the overall consideration of “financial sophistication” than when considering the total of relevant respondents in this study ( $n_1 = 502$ ), which additionally includes respondents with a secondary school leaving certificate, intermediate school leaving certificate and vocational training. In addition, the average score, which is the sum of the correctly answered “Big Three” questions, is higher for the target group of high school students, graduates, and young professionals ( $M = 2.31$ ;  $SD = 0.88$ ) than when considering all respondents ( $M = 2.27$ ;  $SD = 0.90$ ). When analysing the target group of high school students, graduates, and young professionals ( $n_2 = 446$ ) in terms of educational level, measured by the highest level of education, it becomes clear that more than half of the respondents (57%) have completed high school.



**Figure 1.** Distribution by educational level

*Source:* Own survey

More than a third of respondents (35%) already have a bachelor's degree. On the other hand, only 2% have a diploma and 0.2% have a doctorate. In addition, 6% of respondents have completed a master's degree. Accordingly, the most significant proportion of respondents in the target group of high school students, graduates, and young professionals has an intermediate level of education (Abitur) as defined in this research. Furthermore,

when looking at the target group of high school students, graduates, and young professionals, it is also evident that 59% of the respondents are female, and 41% are male.

Distribution by gender

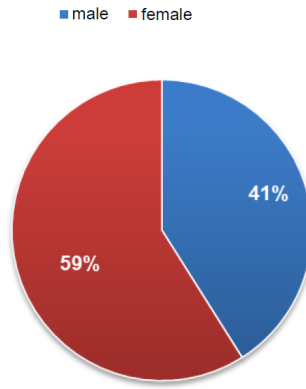


Figure 2. Distribution by gender

Source: Own survey

Furthermore, the analysis shows that 273 of the 446 female and male respondents (61%) in the target group of high school students, graduates, and young professionals are between 18 and 25 years old, as figure 3 clarifies.

Comparison of age and education level by gender

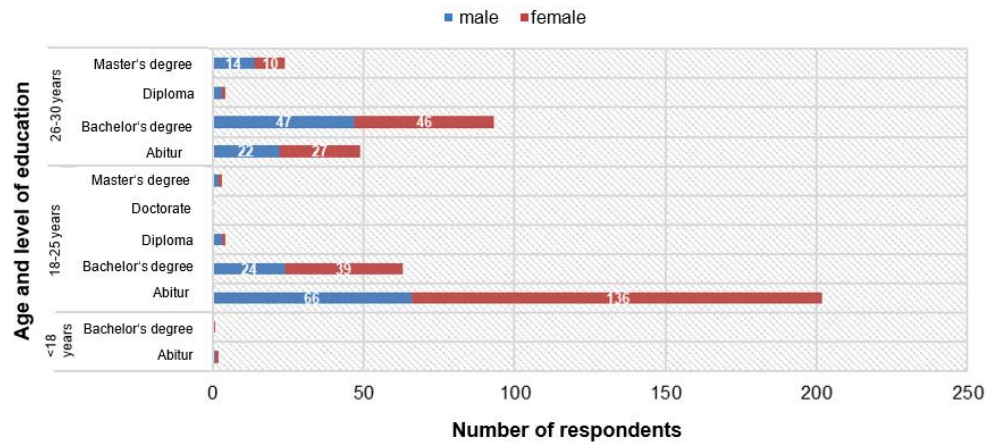
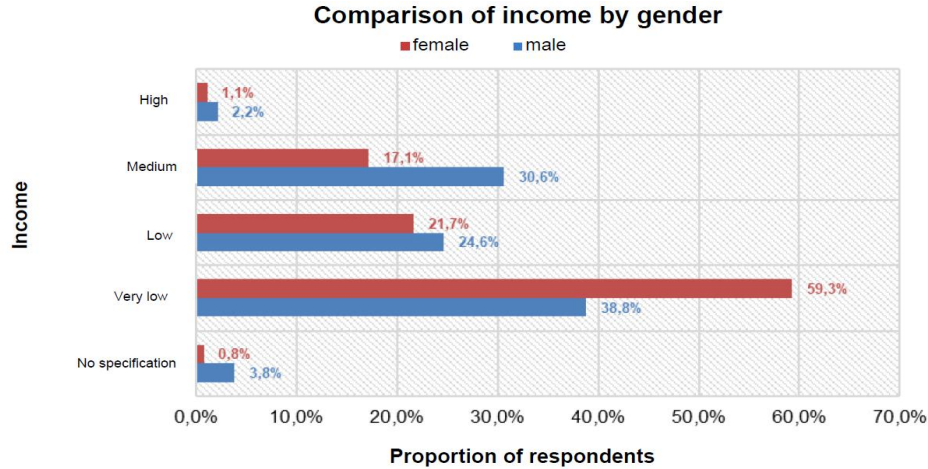


Figure 3. Comparison of age and education level by gender

Source: Own survey

When comparing the women and men surveyed, it becomes clear that men in this study have a higher level of education in the form of educational attainment. Of the 263 women surveyed, 164 (62%) have only a high school diploma as their highest educational qualification. Among the men surveyed, on the other hand, only 89 out of 183, and therefore less than half, have a high school diploma as their highest educational qualification. The analysis of income figure 4 illustrates that 81% of women have a very low or low income, whereas this is the case

for only 63% of men. In particular, a very low income (net monthly income of fewer than 1,000 euros) affects 59% of the women surveyed and only 39% of the men surveyed. Based on this finding, it is evident that women in this study have lower incomes than men.



**Figure 4.** Comparison of income by gender

*Source:* Own survey

Further descriptive analysis of the target group of high school students, graduates, and young professionals shows that the proportion of female respondents who live in a city is lower (40%) than the corresponding proportion of male respondents (48%). In addition, the proportion of female respondents with a practical education is higher (65%) than the proportion of male respondents, 57%. There are only marginal differences between the female and male respondents in terms of their parents' educational level and origin.

#### 4. Results and analysis

As part of this research, a simple linear regression model was first defined and tested for each thesis. The result from H1 was not included in the overall model, regardless of significance, as it relates to all relevant data sets and is intended to show that the target group of high school students, graduates, and young professionals, which are part of this research, have a higher financial education than respondents with a lower secondary school leaving certificate, intermediate secondary school leaving certificate or respondents with only an education.

##### *Education level*

The results regarding the hypothesis that a higher level of education in the form of better educational attainment leads to a higher level of financial literacy can be seen in the following table 4:

**Table 4.** Results H1 - Education level

	Estimate	Standard Error	T-Statistics	P(> t )
Constant = Education level: high	2,3161	0,0645	35,928	<2e-16 ***
Educational level: medium	-0,0157	0,0856	-0,183	0,8548
Education level: low	-0,2548	0,1433	-1,779	0,0759
Educational level: very low	-0,8875	0,3446	-2,576	0,0103 *

n<sub>1</sub> = 502; df = 498

Level of significance: '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1

Source: Own survey

Respondents with a high level of education act as the comparison group in this analysis and have a score of 2.32 on average. This is not significantly different from the score of respondents with an intermediate level of education. Respondents with lower levels of education have a different score at a 10% significance level than respondents with high levels of education. In this analysis, the result is on average 0.25 points worse. On average, respondents with a very low level of education answered almost one additional question inadequately compared to respondents with a high level of education. The result is significant at the 5% level.

### Gender

The results regarding the hypothesis that gender influences the level of financial literacy can be seen in table 5:

**Table 5.** Results H2 - Gender

	Estimate	Standard error	T-Statistics	P(> t )P(>t)
Constant = Gender: male	2,5671	0,0629	40,813	<2e-16 ***
Gender: female	-0,4428	0,0820	-5,404	1,07e-07 ***

n<sub>2</sub> = 446; df = 444

Level of significance: '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1

Source: Own survey

The comparison group of men surveyed has an average score of 2.57. On average, women have a score of 0.44, worse than men. The result is significant at a level of 0.1% and confirms existing research findings from past studies. In addition, it demonstrates that women in the target group of high school students, graduates, and young professionals have lower financial literacy than men.

### Income

The results regarding the hypothesis that higher income leads to higher levels of financial literacy can be seen in the following table 6:

**Table 6.** Results H3 – Income

	Estimate	Standard error	T-Statistics	P(> t )P(>t)
Constant = income: very low	2,2291	0,0580	38,409	<2e-16 ***
Income: low	0,1729	0,1042	1,659	0,0979.
Income: medium	0,1472	0,1046	1,407	0,1601
Income: high	0,6281	0,3355	1,872	0,0619.
Income: not specified	-0,2291	0,2972	-0,771	0,4412

n<sub>2</sub> = 446; df = 441

Level of significance: '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1

Source: Own survey

Only limited evidence supports the hypothesis that high-income respondents have better financial literacy than low-income respondents. For example, the results of middle-income respondents are not significantly different from those of very low-income respondents. In contrast, low-income respondents outperform very low-income respondents at the 10% significance level. High-income respondents are distinguishable from very low-income respondents at the 10% significance level.

The results are ambiguous. There is no strong indication that incomes differ from the comparison group at a high significance level. Moreover, the finding that low-income respondents perform better than middle-income respondents is inconsistent with H3.

#### *Residence*

The results regarding the hypothesis that respondents who live in a city have a higher level of financial literacy can be seen in the following table 7:

**Table 7.** Results H4 - Place of residence

	Estimate	Standard error	T-Statistics	P(> t )P(>t)
Constant = residence: small place	2,2756	0,0780	29,191	<2e-16 ***
Residence: City	0,0028	0,1003	0,028	0,978
Residence: Big city	0,1084	0,1107	0,979	0,328

n<sub>2</sub> = 446; df = 443

Level of significance: '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1

Source: Own survey

There is no indication that place of residence influences financial literacy. Against financial literacy background, it can be interpreted that state education is equally good in rural regions and large cities. Freely accessible continuing education opportunities, such as online courses, could also mitigate this.

#### *Practical training*

The results regarding the hypothesis that pre-college work-based education leads to higher levels of financial literacy can be seen in the following table 8:

**Table 8.** Results H5 - Practical training

	Estimate	Standard error	T-Statistics	$P(> t )P(>t)$
Constant = practice-related training: yes	2,2333	0,0715	31,230	<2e-16 ***
Practical training: no	0,1326	0,0888	1,493	0,136
Practical training: not relevant	-0,1833	0,2085	-0,879	0,380

n<sub>2</sub> = 446; df = 443

Level of significance: '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1

Source: Own survey

There is no evidence to support the hypothesis that practical training before university influences the degree of financial literacy. The comparison group is respondents with a practice-based education. They have an average score of 2.23. This is not significantly different from the score of respondents without practice-based education. During their studies, many students complete mandatory internships, which compensate for the upstream practice-based training.

#### *The educational level of parents*

The results regarding the hypothesis that the educational level of parents, if at least one parent is an academic, has a positive influence on the level of financial literacy can be seen in the following table 9:

**Table 9.** Results H6 - Educational level of parents

	Estimate	Standard Error	T-Statistics	$P(> t )P(>t)$
Constant = Academic: yes	2,3065	0,0645	35,758	<2e-16 ***
Academics: no	0,0024	0,0845	0,029	0,977
Academics: not specified	-0,3065	0,8821	-0,347	0,728

n<sub>2</sub> = 446; df = 443

Level of significance: '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1

Source: Own survey

In this evaluation, there is no indication that the educational level of the parents influences the level of financial literacy of the respondents. This is because the research refers to the target group of high school students, graduates, and young professionals, and consequently, the respondents have at least a high school diploma. Above this level of education, the influence of the parent's level of education on the degree of financial literacy is not present, and therefore no evidence for H6 is found.

#### *Origin*

The results regarding the hypothesis that an immigrant background, and thus origin, harm the level of financial literacy can be seen in the following table 10:



**Table 10.** Results H7 - Origin

	Estimate	Standard error	T-Statistics	P(> t )P(>t)
Constant = Migration background: no	2,3471	0,0459	51,186	<2e-16 ***
Migration background: yes	-0,1826	0,1085	-1,683	0,0931.
Migration background: not specified	-0,8471	0,4392	-1,929	0,0544.

n<sub>2</sub> = 446; df = 443

Level of significance: '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1

Source: Own survey

In this evaluation, the comparison group includes respondents who do not have a migration background. They have an average score of 2.35. Both respondents with an immigrant background and respondents who did not specify have a different score than the comparison group at a significance level of 10%. On average, the score is 0.19 lower for respondents with an immigrant background. For respondents who did not give any information, the score is even 0.85 lower. This shows that respondents with a migration background have a lower level of financial literacy.

#### Consolidated view

To mitigate the “omitted variable bias” described above, the significant influencing factors were considered in a consolidated manner in an OLS estimation. The following result was obtained from the compact consideration of the influencing factors of gender, income, and origin utilizing an OLS estimation:

**Table 11.** Survey results - Summary view

	Estimate	Standard error	T-Statistics	P(> t )P(>t)
Constant <sup>2</sup>	2,6214	0,0887	29,554	<2e-16 ***
Gender: female	-0,3242	0,0845	-3,839	0,000142 ***
Income: high	0,2011	0,3193	0,630	0,529210
Income: medium	0,0104	0,0995	0,105	0,916664
Income: low	0,0386	0,0976	0,395	0,692920
Income: not specified	-0,1953	0,2803	-0,697	0,486282
Migration: yes	-0,1516	0,1006	-1,506	0,132689
Migration: not specified	-0,5831	0,4136	-1,410	0,159347

n<sub>2</sub> = 446; df = 435

Level of significance: '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1

Source: Own survey

In this OLS estimate, the comparison group consists of male respondents with a very low income and no migration background. In addition, this OLS estimate showed that only the influencing factor “gender” is significant. On average, women have a score of 0.32 lower than the comparison group. In summary, this research study found that only the influencing factor “gender” (H2) affects the level of financial literacy in the target group of high school students, graduates, and young professionals. For the other hypotheses, the regression analysis shows no clear indication in the consolidated view.

## Summary

Apart from the significant findings about gender and origin (the level of financial literacy was significantly lower among individuals with an immigrant background), it was confirmed above all by the statistical review that measuring financial literacy using the established “Big Three” questions is not sufficient for individuals with a high level of education. Future questionnaires must include a higher level of difficulty and more questions regarding compound interest and inflation (Hou & Schuler, 2022). The significant gender gap could be better researched in upcoming surveys by including questions on the social and cultural environments in which girls and boys live (Bottazzi & Lusardi, 2021).

## 5. Discussion

The results presented are based on the data set regarding the “Big Three” questions and are subject to their limitations. From the experience of scientific research, the answers of the respective study participants depended strongly on the formulation of the question (Alessie et al., 2011). In addition, participants had no incentives to answer the questions correctly or to ask third parties for assistance (Hastings et al., 2013). From a methodological point of view, it is desirable to have an instrument of measurement that consists of several questions and at the same time has different levels of difficulty. This finding results from the fact that neither the “Big-Three” questions nor the extended version of the “Big-Five” questions, due to their small number of questions and only rough categorization, are only suitable in a limited way to query and test a deep understanding of financial literacy (Nicolini & Haupt, 2019). A broad-based household panel study in Germany identified the inadequacy of the current measurement of financial literacy. In addition, this study recommended an extension of the financial literacy questionnaire (Hou & Schuler, 2022).

In the present work, the fact that the “Big Three” questions appear insufficient to differentiate between a medium and a high level of education came into play in particular. This circumstance resulted in low variation in most hypotheses. Consequently, significantly more complex questions show a more considerable variation and are better suited as explanatory variables. Building on this, other approaches have become established in the literature. For example, Knoll and Houts (2012) developed a psychometrically sound questionnaire to measure financial literacy. This consists of 20 questions, which include the “Big Three” questions. The questionnaire is characterized by high comparability as well as validity (Knoll & Houts, 2012).

The survey results show that this questionnaire indicates whether an individual is making provisions for old age, for example. At the same time, the “Big-Three” questions represent a significant measure of financial literacy, which was confirmed by a high correlation with the results Knoll and Houts (2012) affirmed. Due to the described limitation of available instruments, the literature often uses sociodemographic factors such as wealth, income, educational status, intelligence, gender, age, or occupation as proxies for the degree of financial literacy (Christelis et al., 2010; Bannier & Neubert, 2016; Bianchi, 2018). Especially the influence of rationality on the level of financial literacy should also be included in the measurement process of financial literacy (Kubak et al., 2021).

Given the significant gender gap in financial literacy, whose causes can also be traced back to the parental background, the role of mothers in particular, which is important for girls' financial literacy, should be investigated more comprehensively in the future. In addition, the social and cultural environment in common in girls' and boys' lives, which plays a crucial role in explaining gender differences, should also be considered to explain this gender gap (Bottazzi & Lusardi, 2021). In recent research, studies conducted among high school and college students revealed that there is a relationship between financial literacy and the number of family members. For example, students from families with more members demonstrated better financial literacy than students from families with fewer members (Kubak et al., 2021). Siegfried & Wuttke (2021) reveal in their study

that gender and educational background significantly influence financial literacy and thus financial learning opportunities as well as the ability to deal with gratification deferral.

Research on the interaction effects of financial literacy and risk aversion, in particular, must be given greater priority in future research. They are crucial for potential start-up behavior (Riepe et al., 2022).

## **6. Conclusions**

The research paper examined various factors influencing the financial literacy of high school students, graduates, and young professionals. In addition, the influence of different characteristics of educational level, income, gender, and origin was examined. To this end, seven hypotheses were formulated. In the work context, financial literacy was approximated using a questionnaire known in the literature, the so-called “Big Three” questions. For this purpose, over 500 individuals were surveyed.

Although the literature has dealt extensively with the determinants of financial literacy, no recent study focuses on the German market and is limited to individuals with higher levels of education. The latter is significant because the characteristics of low educational levels are already well researched.

A simple linear regression model was formulated for each hypothesis to evaluate the results and then tested for significance using the T-test. Subsequently, a multivariate regression model based on the significant influencing factors was specified and tested again. The gender factor is highly significant. Immigration background also influences financial literacy. The results concerning education, origin, and income were sometimes ambivalent or weak. No indication was found for an influence of the place of residence, the parent’s educational level, or a practice-related education. In the multivariate model, the results concerning gender were still significant. The results suggest that the complexity of the “Big Three” questions is insufficient to differentiate well between elevated levels of education (Hou & Schuler, 2022).

This paper provides a good overview of the status of financial literacy of high school students, graduates, and young professionals within Germany. As expected, the importance will increase in the coming years when demographic changes require the modernization of the pension system. In this respect, there are many possibilities for granular studies, e.g., psychometric questionnaires.

Future research should therefore include other components in the financial literacy survey such as an additional question on compound interest (Hou & Schuler, 2022) or socio-demographic characteristics or the history of origin and family composition (Bottazzi & Lusardi, 2021). This would also provide a more in-depth analysis of the gender gap. Also concerning the start-up culture, which is significantly related to risk aversion and risk understanding, questions regarding these aspects should be included in future panels (Riepe et al., 2022).

The findings of this research paper underpin the urgency of strengthening the financial literacy of women to establish equitable prosperity and income conditions within a diverse society. It also reinforces the call for greater financial literacy support for immigrants to ensure their integration into the German affluent society.

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