

# *Subjective vs. objective assessment of financial literacy – do beliefs meet reality?*

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*Abstract.* This paper investigates the problem of financial literacy, which is analysed from two perspectives. The first is the knowledge about saving and loans, and the other – the relations between subjective knowledge (SK) and objective knowledge (OK) and their impact on financial decisions. The analyses were made on the basis of quantitative studies conducted using the structured face-to-face interviews method. The sample consisted of 438 persons from Wielkopolska (Poland). The results suggest that there is a higher differentiation of knowledge about saving compared with the knowledge about loans and in general, slightly higher level of knowledge about loans. The research confirms significant relations between chosen financial behaviours (being experienced or unexperienced) and the level of SK and OK. The greater differences were measured for SK. The study also featured a group of respondents who self-assess their knowledge on a level close to their objective knowledge, as well as those who overestimate and those who underestimate it. These segments were described taking into account demographic and economic features.

*Keywords:* objective financial knowledge, subjective financial knowledge, financial behaviour.

*JEL Codes:* A20, D14, G11, I21.

## **1. Introduction**

The level of financial knowledge and the ability to make financial decisions is a subject investigated by many researchers, in particular in the context of the lack of knowledge, the ability to make basic calculations, and the possible consequences of financial exclusion [Ambuehl et al. 2014] as well as the inability to assess financial instruments and their usefulness to consumers [Benartzi, Thaler 2001; Choi et al. 2009; Lusardi 2008; Lusardi, Mitchell 2007; Białowas 2013; Olejnik 2016]. Authors find also other mixed evidence that financial education interventions affect

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behaviour [Hastings et al. 2012; Lusardi, Mitchell 2014; Potocki 2017; Cole et al. 2014; Fernandes et al. 2014].

According to the definition of the OECD [2015], financial literacy is “*a combination of awareness, knowledge, skill, attitude and behaviour necessary to make sound financial decisions and ultimately achieve individual financial wellbeing*”. Although this definition is widely accepted, there is lively discussion about operationalization of the following terms [Świecka 2018].

When writing about financial literacy, the difference between subjective and objective assessment should be borne in mind. Subjective knowledge results from a consumer’s self-assessment and is usually measured this way [Alba, Hutchinson 2000; Bearden et al. 2001; Carlson et al. 2009]. Objective knowledge, on the other hand, is measured with a set of questions in which the correctness of respondents’ answers is evaluated.

Naturally, the result of the measurement in both cases to a great extent depends on the method used. In order to render the results comparable, standardised tests are frequently used, e.g. the questionnaire compiled by the OECD [2015] or the Big Three Questions proposed by Lusardi and Mitchell [2008]. A comprehensive overview of financial literacy measurement methods is offered by Huston [2010].

The majority of reviewed papers show a positive correlation between scores of financial literacy and sound financial behaviour, but the magnitudes of the estimated effects are non-comparable [Hastings et al. 2012]. The influence of financial literacy on financial decisions was studied by Disney et al. [2015], checking the effect of financial literacy on the credit decisions, and by Bucher-Koenen and Lusardi [2011], finding a strong correlation between financial literacy and recognition of the need for and the financial benefits of saving for retirement. The research conducted by Lusardi and Mitchell [2007] also confirmed this strong relationship: households planning for retirement give more often correct answers to all of the questions (compared to non-planners).

The study by Clark et al. [2017] proves a positive relationship between individuals’ financial literacy and their propensity to participate in a retirement plan. Some additional papers also confirm the relation between financial literacy and savings behaviour [Chan, Stevens 2008; Behrman et al. 2012], and the fact that financially literate individuals are more eager to plan ahead.

The influence of financial literacy on lending behaviours is much less documented. Well-known publications on this subject most frequently study the relationship between the increased exposure of consumers with a lower level of literacy to disadvantageous loan contracts, high fees and interest rates [Disney, Gathergood 2013] and an increased propensity to take out payday loans [Lusardi, Scheresberg 2013] on the American market, and Disney and Gathergood [2013] confirming the same findings for the UK.

Significant variation has been reported in the literature regarding the relationship between objective and subjective knowledge. Carlson et al. [2008], in their extensive literature review, reported the positive correlation of 0.54 obtained by Brucks [1985]

for knowledge of sewing machines, but found in contrast, that other research came to opposite results: Ellen [1994] reported no correlation ( $r = 0.08$ ) for ecological behaviour, and similarly, Duhan et al. [1997] found a very weak correlation ( $r = 0.15$ ) for medical services.

Given the findings and mixed results Carlson et al. [2008] conducted a meta-analysis of the objective and subjective relations. On the basis of 103 independent samples in 51 articles/books, they confirmed a significant relationship. The relationship is strongly moderated by the character of the object. Stronger relations are observed with durable goods, public goods and luxury goods. Much weaker relations are found for services and necessities. The correlations for financial services [Chiou et al. 2002; Goldsmith et al. 1997; Goldsmith, Goldsmith 2006] turned out to be in the group of weaker relations.

Taking the results of previous research into account, the main scope of this study can be stated as: (1) measuring the relations between subjective knowledge (SK) and objective knowledge (OK); (2) confirming and comparing impacts of subjective and objective knowledge on financial decisions of households.

## **2. Methodology**

The study was conducted in 2015 on the sample of consumers from the Wielkopolska (Greater Poland) region in Poland. The interviews were in the form of a structured face-to-face interview questionnaire, with a sample that consisted of 438 individuals. The quota sample reflected the type of occupation, as well as the age and education level of the head of the household. Subjective knowledge was tested by means of two questions: one was self-assessment of the respondent's knowledge about saving, and the other, self-assessment of knowledge about loans. In both cases, a five-point ordering scale was applied. Objective knowledge was assessed by means of checking the ability to calculate the value of a long-term deposit (two-period compound interest) and loan interest.

## **3. Results**

Subjective assessment was analysed first. It was divided into two aspects: one concerning savings and the other, loans. Half of the consumers believe that their knowledge is average, a third lower than average, and every fifth person believes that they are knowledgeable or very knowledgeable about saving. Interestingly, self-assessment is considerably higher in the case of loans. Below average, the percentage is the same (33%), however, the percentage of those who believe that their knowledge is average is relatively low (36%), and of those believing that they know a lot about loans reaches the level of 30%.

As anticipated, both components of financial knowledge self-assessment are strongly correlated (Spearman's rank correlation  $\rho=0.66$  and its significant  $\alpha=0.01$ ). Describing the segments of low, medium and high levels of knowledge would be

quite obvious (depending mostly on income and education); however, it is less obvious and more intriguing to extract based on the asymmetry in their assessment of financial knowledge:

- groups with a better knowledge about deposits than loans (g1);
- groups with comparable knowledge about both (g2);
- groups with better knowledge about loans than deposits (g3).

Table 1 presents this system. To simplify it, the number of variable levels was reduced from five to three.

*Table 1. Subjective knowledge about saving and loans – structure (column percentage)*

|                         |         | Knowledge about saving - levels |          |          |          |
|-------------------------|---------|---------------------------------|----------|----------|----------|
|                         |         | total                           | low      | average  | high     |
| Loan knowledge - levels | low     | 33.4                            | 71.4(g2) | 18.9(g1) | 2.4(g1)  |
|                         | average | 35.9                            | 23.1(g3) | 53.4(g2) | 15.5(g1) |
|                         | high    | 30.7                            | 5.4(g3)  | 27.7(g3) | 82.1(g2) |

Source: Author's own calculations.

The chi-squared test confirms the anticipated correlation between variables ( $\chi^2= 238.4$ ,  $df=4$ ,  $p<0.05$ ). The segment about comparable knowledge is the greatest (two thirds), every fourth person has a higher level of knowledge about loans, and every eighth – a higher level of knowledge about saving. When analysing the features of particular segments, it turns out that in the case of better knowledge about saving, it relatively more often concerns individuals living in households consisting of one or two people. In the case of a higher level of knowledge about loans, it more frequently concerns those aged 30-50 (every third) and those living in households consisting of four people (29%).

The next step in the analysis was to test objective knowledge in both areas. In the case of knowledge about saving, the verifying question was: *There is PLN 200 in a bank deposit. The interest is 10% annually. How much money will be in the deposit after two years?* Only a half of consumers are able to correctly calculate the future amount of the deposit (51%). Relatively prevalent are men (60%), younger people (62%), with a university degree (66%).

Knowledge about loans was tested with two questions of different levels of difficulty. *The interest on a loan of PLN 5k is 10%. It is repaid in a single payment, after one year. How high will be the amount to be repaid?* and *The interest on a loan of PLN 100k is 12% annually. The borrower pays back PLN 800 a year. How many years will it take to repay the loan?* Over 75% of consumers are able to answer the first question correctly. The other, more difficult question was answered correctly by 17%

of the consumers. The profile of those responding correctly to both questions is consistent with the profile of those knowledgeable about saving, although it should be noted that in the case of knowledge about loans, the difference is much less significant – the ranges per category are no higher than 10 percentage points.

In the next step, the levels of subjective and objective knowledge were checked for the groups of people experienced and not experienced in chosen financial behaviours. For full comparativeness, levels of knowledge were standardized (zscores). The differences are significant ( $p < 0.05$ ) for both subjective and objective knowledge in cases of making a deposit, buying shares or bonds, buying mutual funds units and borrowing money. In two cases, only the differences for subjective knowledge are significant ( $p < 0.05$ ): taking out a mortgage loan and lending money. As stated above, for payday loans the experienced group had lower scores of objective knowledge, but for payday loans both differences were insignificant.

*Table 2. Knowledge level difference between experienced (yes) and non-experienced (no) customers – statistical differences*

|                                   | Zscore | Mean: no | Mean: yes | Significance | Sig. (2-tailed) | mean difference |
|-----------------------------------|--------|----------|-----------|--------------|-----------------|-----------------|
| Deposit                           | SK     | -0.29    | 0.13      | 0.323        | 0.000           | -0.42           |
|                                   | OK     | -0.15    | 0.07      | 0.521        | 0.032           | -0.22           |
| Shares/bonds                      | SK     | -0.18    | 0.33      | 0.124        | 0.000           | -0.51           |
|                                   | OK     | -0.13    | 0.25      | 0.344        | 0.000           | -0.38           |
| Mutual funds                      | SK     | -0.11    | 0.29      | 0.695        | 0.000           | -0.40           |
|                                   | OK     | -0.10    | 0.26      | 0.023        | 0.001           | -0.36           |
| Loan over 5 years                 | SK     | -0.11    | 0.08      |              | ns.             |                 |
|                                   | OK     | -0.10    | 0.07      |              | ns.             |                 |
| Mortgage                          | SK     | -0.14    | 0.39      | 0.008        | 0.000           | -0.52           |
|                                   | OK     | 0.09     | -0.03     |              | ns.             |                 |
| Lent to someone over 2k PLN       | SK     | -0.14    | 0.14      | 0.336        | 0.004           | -0.27           |
|                                   | OK     | -0.09    | 0.09      |              | ns.             |                 |
| Borrowed from someone over 2k PLN | SK     | -0.07    | 0.15      | 0.75         | 0.029           | -0.22           |
|                                   | OK     | -0.05    | 0.10      |              | ns.             |                 |
| Payday loan                       | SK     | 0.00     | 0.00      |              | ns.             |                 |
|                                   | OK     | 0.01     | -0.27     |              | ns.             |                 |

Source: Author's own estimations.

Finally, in order to answer the question from the article's title, both types of knowledge assessment (subjective and objective) were put together. First, a short description of the aggregated indices. For self-assessment, an index that was the average self-assessment of knowledge about loans and saving was applied (SK-index). For objective knowledge, a four-level scale (0-3) was applied, meaning the number of correct answers (OK-index). Basic statistics for both indices are presented in Table 3. In order to facilitate the comparison, the table also contains the standardised values of both indices

*Table 3. Basic characteristics of the indices of subjective and objective knowledge*

|                    | SK-index | OK-index | Zscore(SK-index) | Zscore(OK-index) |
|--------------------|----------|----------|------------------|------------------|
| Mean               | 2.83     | 1.45     | 0.000            | 0.000            |
| Median             | 3        | 2        | 0.175            | 0.594            |
| Standard deviation | 0.97     | 0.93     | 1.000            | 1.000            |
| Skewness           | -0.05    | -0.07    | -0.050           | -0.070           |
| Kurtosis           | -0.50    | -0.87    | -0.496           | -0.865           |
| Minimum            | 1        | 0        | -1.887           | -1.566           |
| Maximum            | 5        | 3        | 2.237            | 1.675            |

Source: Author's own calculations.

As anticipated, the indices are positively correlated (correlation of 0.231, significant at the level 0.01). More interesting is the extraction of groups:

- (A) assessing their knowledge as higher than objective;
- (B) assessing their knowledge as lower than objective;
- (C) assessing their knowledge adequately.

The groups were extracted by dividing the range of each index into three equal parts.

*Table 4. Relationship between subjective and objective knowledge (column percent)*

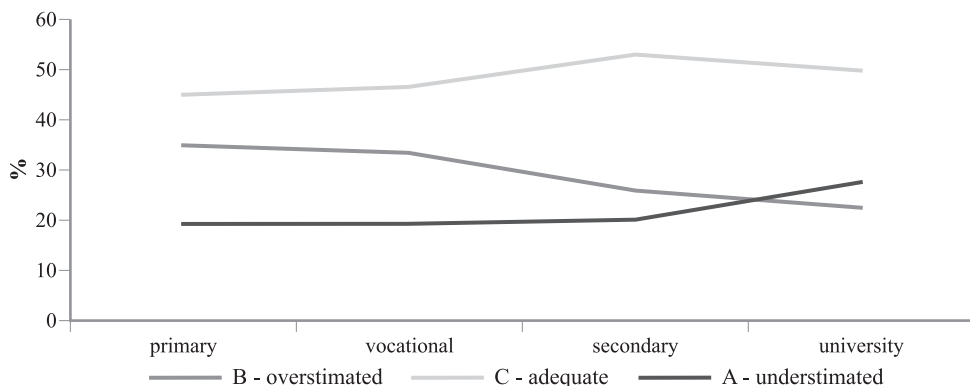
|                      |         | Objective knowledge |         |         |         |
|----------------------|---------|---------------------|---------|---------|---------|
|                      |         | total               | low     | average | high    |
| Subjective knowledge | low     | 28.8                | 45.6(C) | 26.2(B) | 18.5(B) |
|                      | average | 53.9                | 49.4(A) | 55.1(C) | 53.7(B) |
|                      | high    | 17.4                | 5.1(A)  | 18.7(A) | 27.8(C) |

Source: Author's own calculations.

After calculating the sizes of groups A, B and C it turns out that half of the consumers assess their knowledge adequately (C), 27% of consumers overestimate their knowledge (A), and 23% of them (B) underestimate it. Interestingly, contrary to expectations, the segments are not very diverse in terms of demographic and economic traits. The ability to accurately assess one's financial knowledge (C) is slightly more common in women (56%), and top earners (56% as well), but also among office workers (67%) and pensioners (57%).

The propensity to overestimate one's financial knowledge falls considerably with incomes (from every third person of among those earning the least to every eleventh person of those earning the most). Relatively more often this propensity is seen in the case of people with primary/vocational education (every third), teachers (every third) and labourers (also every third).

Figure 1. Adequacy of financial self-assessment vs. education



Source: Author's own calculations.

The propensity to underestimate one's financial knowledge rises with income and education (from 19% of those with primary education to 28% of those with a university degree, and from 16% of those with the lowest incomes to 35% of those with the highest incomes). Relatively more frequently businesspeople underestimate their financial knowledge (every third).

#### 4. Discussion and conclusions

The results of the research suggest that when considering deposits and loans, the inhabitants of Wielkopolska assess their knowledge about loans as higher (subjective knowledge). This may partly result from the obvious financial circumstances and partly from Polish culture – deposits and investments are rarely discussed, while taking out a loan does not have negative connotations. 50% of consumers are able to correctly assess their own financial knowledge.

Persons undertaking deposit and investing activities have a higher level of knowledge, both objective as well as subjective. Persons undertaking loan and credit activities have greater subjective knowledge when taking out a mortgage loan, but those undertaking non-systemic financial activities have higher values of both indices when borrowing from someone and greater subjective knowledge when lending to someone.

Subjective knowledge is more often related to financial behaviour and objective knowledge is only relevant for investing behaviour (purchase of shares, bonds). Still, the strongest relationship with objective knowledge occurs in the case of purchase of shares and bonds and taking out mortgage loans.

The groups of those who overestimate and those who underestimate their knowledge are similar in size (27% and 23% respectively). Demographic and economic features influence the skill to adequately assess one's knowledge, however to a more limited extent than expected. The features which most strongly influence this skill include education, sex and incomes.

But finally, one cannot forget what Milton Friedman suggested, that just as pool players need not be experts in physics to play pool well, individuals need not be financial experts if they can learn to behave optimally through trial and error [Hastings et al. 2012].

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**Abbreviations:**

OK – objective knowledge; SK – subjective knowledge.