

## QUALITY OF THE FINANCIAL LITERACY SURVEY

Monika Čonková<sup>1</sup>

**Abstract:** *Detecting of the financial literacy level is becoming a relevant aspect of the examination of socio-economic problems of the population due to the recent financial crisis and the introduction of new often sophisticated financial market tools becoming more accessible to ordinary consumers. The survey of financial literacy consists of the survey of understanding of financial issues and also of detecting attitudes and consumer behaviour in financial market. Most researchers are being used to describe financial literacy with proportion of correctly answered questions. Since the proper attitudes and manners of behaviour do not exist, it is necessary to appropriately apply valid and reliable indicators supporting the credibility of the level of financial literacy evaluation. Adequately utilized quantitative methods are used in assessing the validity and reliability of the questionnaire items ascertaining the attributes of consumers' attitudes and behaviour in financial market.*

**Key words:** Financial literacy, questionnaire, validity, reliability

### 1 INTRODUCTION

Still ongoing contemporary technological progress and free market has enabled creating and profiting from more complex and riskier financial products offered to wider range of people. Financial market has changed and new financial services and products were developed and own financial decisions of consumers were allowed. On the other hand, such development, financial tools and individual control relates to higher responsibility for the financial decision-making or in a worse case to the necessity to confront potentially inauspicious solutions of financial or property issues.

### 2 LITERATURE REVIEW

The most comprehensive review of published research during the term between 1996 and 2008 that included financial literacy/financial knowledge/consumer/economic literacy (used interchangeably) measures was compiled by Huston in 2010. Her research outcomes offer some definitions. The newer comprehensive study aimed at the term FL was done by Oanea and Dornean (2013) by reviewing the literature and international looking for the definition of terms “financial” and “literacy”, for a better understanding of meanings of these two concepts. Their definition is brief and clear with the emphasis on the financial awareness: “Financial literacy implies a persons’ minimal knowledge about financial terms such as money, inflation, interest rate, credit and others, but besides this the abilities and skills of that person to use all this information in personal life, being aware about the consequences of its financial actions.”

Some published definitions of FL incorporate also personal attitudes towards financial issues of saving, borrowing, investing and securing and active performing on financial market, e.g. Dvořáková (2009)

in Tomášková, Mohelská, & Němcová (2011). Attitudes and personal experiences with financial tools can affect personal behaviour on the financial market, but using them as a factor in measuring the FL can distort the overall measure.

Identifying and quantifying the factors of FL, the relations among them and their impact on FL summary indicator is still not the resolved problem. Commonly rate of correct answers on interviewed or surveyed questions are computed. Another negative of FL measure concept is inconsistency in question sets in surveys or at interviews, which are influenced according to subjective FL concept perceived by researchers. Not all studies cover all financial areas. Questions have different difficulty level, they are used in different quantity and they are assessed by different methods, which, i.e. may or may not consider missing replies for incorrect answers or they can reduce sample size for corresponding question. Reliability of the questionnaires is mostly not estimated as it may be low due to a higher dimensionality of the financial literacy questions. Results of the different surveys are usually therefore incomparable and comparability among different populations can be allowed only by using identical question sets (Conková, Bačová, & Závadský, 2013c).

Research about financial literacy, together with studies, in which Slovakia is included, shows weaknesses in financial matters understanding as well as overestimation of the own financial knowledge among adults in reality in every country (Atkinson & Messy, 2012; Balaz, 2012; Harris, 2012; Huston, 2010; Lusardi & Mitchell, 2011; STEM/MARK, 2010).

For the purpose of comparison and identification of relevant and potentially applying best practices in financial education leading to raising the level of FL of the population it is necessary to standardize the evaluation with respect to regional specificities and in addition to determining the level of

FL also to analyse the factors affecting examined knowledge of the respondents. So far, the most extensive studies about current FL aimed at international comparisons are initiatives of the World Bank (Rutledge, 2010) and the Organization for Economic Cooperation and Development (OECD) (Atkinson & Messy, 2011, 2012). Tullio Jappelli (2010) did an extensive analysis of available economic determinants of literacy based on data from 55 countries from 1995 - 2008.

Although these additional surveys are more or less differentiating in target groups of respondents, measurement approach and methods used, it is possible to identify common findings, and these are the above-mentioned low level of FL, literacy correlated with educational attainment and higher scores for self-evaluation of their own knowledge and skills in finance that have been objectively evaluated. Surveys also show that FL tends to be related with higher incomes and wealth of the respondents.

Given the expectation that young people will face more and more complex financial products and services and being adult they will bear greater financial risks than their parents about saving and planning for retirement or to cover their health needs, Governments of different countries have approved documents, in Slovakia it was the National Strategy for Financial Education (approved in 2008) (MESR & MFSR, 2008)) and the OECD incorporated into the regular PISA tests of 15-year-olds (including Slovak) also questions about financial knowledge, attitudes and skills (OECD, 2012).

### 3 OBJECTIVES AND METHODOLOGY

The aim of this paper is to analyse the validity and reliability of the questionnaire assessing financial literacy with a focus on issues of attitudes and behaviour in the financial market. When studying the opinions, attitudes or behaviour there is not a single right answer to the question, therefore such a questionnaire is used to be evaluated by methods utilized in the psychological tests evaluation.

Validity is an important indicator of the quality of questionnaires as measuring instruments. Degree of validity indicates the extent to which test / questionnaire measures the concept (the phenomenon, construct), to which the questionnaire is focused. Index of reliability evaluates the accuracy of such measurements. If the measuring instruments are not valid and reliable, researchers would misinterpret phenomena and managers would apply erroneous related decisions. Reliable measuring instrument produces the same results by repeating the assessment.

The measuring instrument must be reliable to be valid, but if the tool is not valid, it is not reasonable to evaluate reliability. The validity of the measuring instrument means the ability of an instrument to measure the fulfilment of the concept for which it was created. In this paper we focus on the validity of the

construct properties, which we intend measure, assessed by factor analysis.

In the survey issues from the categories of financial attitudes and behaviour in the area of personal finance were evaluated which consisted of scale type questions using Likert scale and dichotomous or semi-closed multinomial choice answers. Within Likert scale questions respondents had to express their extent to which they agree with the statement on the five-point scale from 1-strongly agree after 5 totally disagree. These scales allow us to transform qualitative information about the attitudes and opinions of respondents into quantitative form.

Within the survey conducted by pedagogical workers of Faculty of business economics in Košice, University of Economy in Bratislava, a questionnaire was administered for the examination of the higher education students' financial literacy level. The questionnaire was inspired by International Network of Financial Education OECD (Atkinson & Messy, 2012) as well as the National Standard of financial education (National Standard, 2008).

The survey was conducted via the Internet, the questionnaire was distributed anonymously. Sampling was conducted by impersonal self-selecting questioning. Respondents outside the target group as well as strikingly untrue responses were from analysed data file filtered off. After the deadline for data collection there were responses of 834 respondents (9.2 percent respondents were due to missing or filtered off data excluded from further analysis.)

For data processing and analysing programs SAS Enterprise Guide, SPSS and Microsoft Excel were used.

#### 3.1 Attitudes towards financial matters

Attitudes, opinions, and preferences are considered an important element of financial literacy. If people have rather negative attitude to saving money, probably they will also behave in accordance with this attitude. If they prefer immediate satisfaction of their needs, it is unlikely that they will have deferred savings for emergencies or other long-term financial plans.

Financial literacy survey conducted by the International Network of Financial Education OECD/INFE (2012) contains, for the purpose of analysing the attitudes of respondents regarding the use of money and planning, three questions in the form of statements with which respondents express their degree of their agreement/disagreement:

- I find it more satisfying to spend money than to save it for the long term.
- I tend to live for today and let tomorrow take care of itself.
- Money is there to be spent.

OECD used in the international survey for evaluation the level of financial literacy methodology

that evaluates the attitudes by the proportion of respondents with a positive attitude towards the use of longer-term finance. This positive attitude is expressed by response of full or partial disagreement with all three attitudinal statements (Conková, Bačová, & Závadský, 2013a). In individual issues (three statements) respondents had positive attitude if they had quantified the extent of their disagreements with statements with a value of 4 and 5 on a scale of 1 = strongly agree to 5 = strongly disagree. OECD assessed the attitudes of respondents in the population by the share of those who, in accordance with the principles of financial literacy, in all three statements expressed their disagreement with the statements.

### 3.2 Behaviour in the financial market

In the questionnaire the focus on consumer behaviour is covered by statements for which respondents express the degree of their agreement/disagreement with the statements expressing their thinking before a final decision about buying things or paying their bills on time, or preparing and managing the budget, what information was considered sufficient before the financial decision (Conková, Bačová, & Závadský, 2013b). In the questionnaire except of scale questions also were used dichotomous question about borrowing money to cover current expenses and multinomial question with the possibility to insert their own response for whether they have some form of available funds. All questions were transformed into the form of dichotomous responses (positive response in accordance with financial literacy, a negative response as opposed to financial literacy.) In questions with 5 degrees quantifying level of agreement/disagreement, for positive behaviour is considered level 1 and 2 (or 4 and 5 for sole and overwhelming approval (or disapproval).

## 4 RESULTS: VALIDITY AND RELIABILITY ANALYSIS

For the verification of the appropriateness of measuring tool a validity and reliability analysis was conducted. Reliability of the scale assessed by Cronbach's alpha gives the acceptable result of 0,74 for the whole questionnaire (not distinguishing single concepts) since it is over recommended reliability coefficient of 0,70 (Croasmun & Ostrom, 2011). However, with respect to few variables within each subsequently extracted factors with low communalities, reliability coefficients for individual factors are insufficient (0.76/0.51/0.61/0.56 in the order of the factors mentioned below).

While a high value for Cronbach's alpha indicates good internal consistency of the items in the scale, it does not mean that the scale is one-dimensional (Gliem & Gliem, 2003). Exploratory factor analysis research techniques were used to assess the validity and determine the dimensionality of the survey's scale. According to Thompson (2004) cited by Gliem and Gliem (2003), firstly, factor analysis

reduces a large number of variables into a smaller set of variables (also referred to as factors), secondly, it establishes underlying dimensions between measured variables and latent constructs, thereby allowing the formation and refinement of theory and thirdly, it provides construct validity evidence (properties (factors) measured using the questionnaire). Exploratory factor analysis is often considered to be more appropriate than confirmatory analysis in the early stages of scale development because confirmatory factor analysis does not show how well the items load on the other possible nonhypothesized factors (Hurley et al., 1997). Given that we suppose in the considered analysis financial literacy factors such as attitude and behaviour, we could conduct confirmative factor analysis, but since for used questionnaire items was not published any output as an evidence of their validity, in this paper there is conducted initializing explorative factor analysis looking for the factors at which questionnaire items could load.

Number of collected data for factor analysis is sufficient for factor analysis to be suitable according to rule of thumb with smallest suggested sample size 50 cases (Williams, Brown, & Onsmann, 2012), Kaiser-Meyer-Olkin Measure of Sampling Adequacy (= 0,702; minimum 0,5) and significant Bartlett's Test of Sphericity ( $\chi^2 = 1136,671$ ; d.f. = 66, p-value < 0,000) (Joseph F Hair Jr, Anderson, & Tatham, 1986; Tabachnick, Fidell, & Osterlind, 2001).

Ordinal type of data excludes multinormality, so utilizing the most widely used method in factor analysis supposing the variables' multinormality is an improper procedure in this case. A principal axis factoring as a factor extraction method (Costello & Osborne, 2011) on all items was conducted.

Communalities in factor analysis quantify how much variability in individual variables is shared with other variables, or how much of the variability of each original variable is explained by the extracted factors. All variables in the analysis shared their variance after extraction to the extent of 0.086 to 0.613. Low communalities relate variables: Before buying something, I carefully consider whether I can do it (0.184), Did you save/invest last year? (0.086) and Did you took a loan to cover current expenses in the past two years? (0.148).

Item communalities are considered high if they are all greater than 0.8 (Velicer & Fava, 1998), but such high values of the analysis of real data are unlikely. More often communalities in the social sciences occur in the range from 0.40 to 0.70 (Costello & Osborne, 2011). In this case, the communalities of the three items mentioned above are even lower; it means that it is likely that additional active factors not yet examined could explain the variability of the variables, or more than two variables for one factor would increase the extent of common variance.

An examination of the scree plot of eigenvalues revealed that the curve levelled off after the first four factors (with eigenvalues above 1), not after two factors as it was supposed initially (Figure 1).

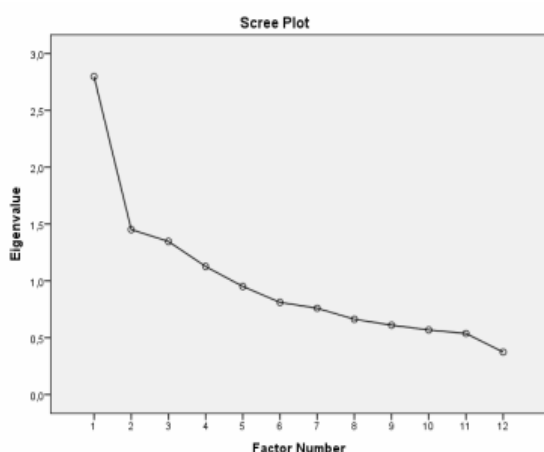


Fig1. Scree plot of eigenvalues. Eigenvalues >1 determine number of relevant dimensions

Pattern Matrix Variables (questionnaire items)	Factor			
	1	2	3	4
1. Before buying something, I carefully consider whether I can do it	,128	,169	,009	<b>,247</b>
2. I pay my bills on time	-,044	-,055	-,033	<b>,752</b>
3. I carefully monitor and control my accounts	,066	,237	-,074	<b>,445</b>
4. Did you take a loan to cover current expenses in the last 12 month?	-,094	-,077	,096	<b>,404</b>
5. I set long-term goals and try to achieve them	,003	<b>,706</b>	,035	-,096
6. I am responsible and prepare my personal budget	-,070	<b>,631</b>	-,020	-,001
7. Did you invest or save money last year?	,011	<b>,220</b>	,068	,069
8. I find it more satisfying to spend money than to save it for the long term	,022	-,010	<b>,580</b>	,132
9. I tend to live for today and let tomorrow take care of itself	,060	,003	<b>,479</b>	,135
10. Money is there to be spent	-,048	,043	<b>,640</b>	-,144
11. I choose financial products after gathering adequate information	<b>,802</b>	-,035	-,023	-,029
12. Choice of financial products I make after look around in the market and after that when I got independent information I requested for advice	<b>,793</b>	-,005	,026	-,049

(Extraction / Rotation Method: Principal Axis Factoring / Promax with Kaiser Normalization; Rotation converged in 5 iterations.)

Table 1 Factor loadings

These four factors accounting for 56% of the survey's responses variation were retained. According

to Hair et al. (1995) in Williams's work (2012), in the natural sciences, factors should be stopped when at least 95% of the variance is explained. In the humanities, the explained variance is commonly as low as 50-60% (Pett, Lackey, & Sullivan, 2003) so the acceptable amount of variance is be explained.

Subsequently oblique Promax rotation (which allows a relationship between factors (Williams et al., 2012) was conducted expecting relationships between factors, for example: more conservative attitudes may more or less affect more conservative behaviour. Factor loadings generated by these analyses are presented in Table. 1. The pattern matrix holds the loadings. Each row of the pattern matrix is a regression equation where the standardized observed variable is expressed as a function of the factors. The loadings are the regression coefficients. The factor scores represent a linear combination of the observed variables weighted by eigenvectors. The observed variables in factor analysis are linear combinations of the underlying and unique factors. The structure matrix holds the correlations between the variables and the factors (Table 2).

Factor	1	2	3	4
1	1,000	,245	,276	,369
2	,245	1,000	,269	,498
3	,276	,269	1,000	,323
4	,369	,498	,323	1,000

(Extraction/Rotation Method: Principal Axis Factoring / Promax with Kaiser Normalization)

Table 2 Factor correlation matrix

All of the 12 items loaded on one of the four factors with minimum value greater than 0,3 except one (item: Before buying something, I carefully consider whether I can do it), despite this its highest saturation loaded to the fourth factor, which corresponds to the reasoning. Hair Jr., Anderson and Tatham (1986) in Aladwani and Palvia's paper (2002) suggest that item loadings > 0,30 are considered significant, > 0,40 are more important, and > 0,50 are considered very significant.

All four rotated factors with included listed items were subjectively named as:

1. Informing before financial decision:
  - a. I choose financial products after gathering adequate information.
  - b. Choice of financial products I make after look around in the market and after that when I got independent information I requested for advice.
2. Decisions about the future financial matters:
  - a. I set long-term goals and try to achieve them.
  - b. I am responsible and prepare my personal budget.
  - c. Did you invest or save money last year?

### 3. Attitudes towards finance matters:

- a. I find it more satisfying to spend money than to save it for the long term.
- b. I tend to live for today and let tomorrow take care of itself.
- c. Money is there to be spent.

### 4. The current financial behaviour:

- a. Before buying something, I carefully consider whether I can do it.
- b. I pay my bills on time.
- c. I carefully monitor and control my accounts.
- d. Did you take a loan to cover current expenses in the last 12 months?

At this stage the extracted factors suggest that four instead of two factors are relevant for the assessing resulting financial literacy level. More statements for different factors groups would be appropriate for the highly significant factors extraction.

## 5 CONCLUSION

The aim of this paper was to verify the basic objectivity characteristics of survey of the level of financial literacy in the area of non-knowledge issues, i.e. verification of the reliability and validity of the evaluation instrument, used in international studies as well as in the research of PHF EU in Bratislava with the seat in Košice, assessing attitudes and behaviour of respondents in the financial market.

Factor analysis of the questionnaire items, common in international as well as in Slovak surveys, revealed the presence of four dimensions of non-knowledge components of financial literacy in contrast to the current concept of distinctive issues of two dimensions (attitudes towards financial matters and issues of behaviour in the financial market). These four dimensions extracted (initially identified as 1. Informing before financial decision; 2. Attitudes towards finance matters; 3. Attitudes towards finance matters and 4. The current financial behaviour) more precisely identify the relatively mutually independent issues that affect the final level of financial literacy. The analysis provides statistically significant and relevant results according to documented procedures, but the level of variability of responses explanations by resulting factors is yet relatively low. To estimate the regression model on the basis of the extracted factors, it is appropriate, therefore, to edit individual questionnaire by increasing the number of themes questions/statements and by modifying the formulations to improve their clarity. Thus verified measuring tool allows extracting statistically significant factors that explain a substantial amount of variables' variance, and so with an objective evaluation of financial knowledge allows to derive model for evaluation and forecasting overall financial literacy or to derive the objectified relationships between level of financial literacy and different economic, demographic and other performance and qualitative indicators.

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#### AUTHOR ADDRESS

<sup>1</sup> Ing. Monika Čonková, PhD.  
University of Economics In Bratislava,  
Faculty of Business Economy in Kosice  
E-mail: [monika.conkova@euke.sk](mailto:monika.conkova@euke.sk)